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ABSTRACT

This report describes an investigation of means of linking programs of the formal education sectors and the nonformal education sectors. The report is organized in three sections. The first section presents an overview, goals and objectives, phases, and interactions between the parties to the investigation. This section also describes the research, analysis, and model design of the project along with pilot activities and evaluation and recommendations. The second section presents implementation guidelines for the linkage processes proposed. The third section presents environmental education objectives from Scouting/USA, a nonformal education sector representative with objectives developed by representatives of the formal education sector. Overlap between the two representative set of objectives is discussed in the context of the linkage model. (RE)

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LINKING FORMAL AND NONFORMAL EDUCATION SECTORS FOR THE ADVANCEMENT OF ENVIRONMENTAL EDUCATION

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FINAL REPORT

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UNITED STATES OFFICE OF EDUCATION

DECEMBER, 1977

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LINKING FORMAL AND NONFORMAL EDUCATION SECTORS FOR THE ADVANCEMENT OF ENVIRONMENTAL EDUCATION

Grant Number: G007601991

Resource Material Development
For Integrative Formal-Nonformal
Environmental Education Program
Development

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FINAL REPORT

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INSTRUCTIONAL AND TRAINING SYSTEMS PROGRAM

FAR WEST LABORATORY
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*Denotes Scout personnel, school administrators, teachers and counselors who served throughout the project on the Design Committee.

PREFACE

This project, LINKING FORMAL AND NONFORMAL EDUCATION SECTORS FOR THE ADVANCEMENT OF ENVIRONMENTAL EDUCATION, was conducted under a grant from the Office of Environmental Education of the United States Office of Education.

The linkage project described herein was conducted by the Instructional and Training Systems (ITS) Program of the Far West Laboratory for Educational Research and Development. The ITS Program also conducted a small linkage project for the Boy Scouts of America (SCOUTING/USA) as part of a larger grant to SCOUTING/USA from the Office of Career Education of the United States Office of Education. The SCOUTING/USA project was also concerned with linking programs of the formal and nonformal education sectors, but with a career -- rather than environmental -- education emphasis. The pilot program for the SCOUTING/USA project focused on careers in the environment, especially energy and land use. Thus, the work conducted for this Environmental Education Linkage Project was extended through the Career Education Linkage Project.

This report is organized in three parts. PART ONE, REPORT ON THE PROJECT, contains two sections: Section I, Overview of the Project, presents a general approach to the project, the project goals and objectives, the project phases, and the interactions between Far West Laboratory and members of the SCOUTING/USA national staff. Section II, A Description of the Project, discusses the project phases of research, analysis and model design, pilot activities, and evaluation as well as presenting findings, analysis, interpretation, and recommendations.

PART TWO, A GUIDE TO INTERORGANIZATIONAL LINKAGE IN EDUCATION, presents in Section I, the generic linkage model that is applicable to linkage efforts between formal and nonformal educational agencies; and, in Section II, the

implementation guidelines for engaging in the linkage process. These guidelines may be used by anyone desiring to conduct a linkage program.

PART THREE, STUDY REPORT: ANALYSIS AND RECOMMENDATIONS, ENVIRONMENTAL EDUCATION CONTENT IN THE MATERIALS AND PROGRAM OF SCOUTING/USA; presents environmentally-relevant objectives taken from Scouting materials. These objectives from an organization that represents the nonformal educational sector were compared with similar objectives developed by a federal committee representing the formal educational sector. This comparison of the two sets of environmentally-relevant objectives satisfies one procedural step in the linkage model -- that of identifying the overlap of the environmental education programs conducted by the agencies representing the two educational sectors in the linkage arrangement.

EXECUTIVE SUMMARY

This project, LINKING FORMAL AND NONFORMAL EDUCATION SECTORS FOR THE ADVANCEMENT OF ENVIRONMENTAL EDUCATION, explored ways to strengthen collaboration between the formal and nonformal education sectors for the purpose of improving and extending the environmental education programs of both agencies. This effort was funded by the Office of Environmental Education of the U.S. Office of Education.

The Instructional and Training Systems (ITS) Program of Far West Laboratory (FWL) conducted the project and served as the facilitating organization coordinating the interaction among the various groups. Bela Banathy, ITS Program Director, was Principal Investigator, and Dru Simms Robinson was Project Coordinator.

Project staff developed the basic plan for conducting the project and approached representative organizations of the two educational sectors. Formal education was represented by a local educational agency -- the Unified School District in Alameda, California. Nonformal education was represented primarily by SCOUTING/USA, a national organization reaching young people across the country. The local Scout Council in Alameda served as the participating local group within the Scouting organization. At the national level, Mr. Ted Pettit, Director of the Conservation Service, served as special consultant to the project. Other national staff members contributed expertise relevant to the age groups in the organization.

The Alameda Scout Council and Unified School District were invited to participate in the year-long project (September, 1976 to August, 1977) to design, develop, test, and report on a generic linkage model between the environmental education programs of the formal and nonformal education sectors, and on possible linkage arrangements that might be generated through implementation

of the model. During the year, interaction occurred also with an Audubon Society program and, on an exploratory basis, with Sierra Club representatives.

At the same time, the ITS program staff was conducting a smaller linkage project with the Alameda groups, focusing on career education programs. The knowledge base and generic linkage model specifications for linking formal and nonformal educational agencies were applicable to both the career and environmental education projects.

The environmental linkage project was conducted in six stages. Those stages and their significant outcomes are discussed below.

During the Research and Analysis stage, project staff gathered, studied, and interpreted literature on interorganizational linkages, and related that information to the problem area of formal/nonformal educational agency linkages in environmental education programs. Linkage information indicated that two basic requirements of any linkage model were those of coherence -- which would enable the model to sustain operations -- and adaptability -- which would enable the model to adjust to changing requirements and demands. A study was also conducted of existing environmental education programs, and materials were gathered on a nationwide basis, with special emphasis on California.

The knowledge base developed during this stage contributed to model design and to project decisions throughout the year. The base was continually modified and added to as new information became available.

During the Design stage, the overall specifications for the generic model were produced. A study of overlapping as well as unique environmental education goals and program domains of the two educational sectors -- formal and nonformal -- led to the consideration of alternative linkage/integration configurations. These were submitted to representatives of participating agencies for comment.

Alameda school and Scout people who were interested in the project were invited to form a Design Committee to contribute to the model design and provide

ongoing professional input. The resulting group, composed of some seventeen people representing various levels in both organizations, met regularly throughout the project year. The contribution of the Design Committee throughout the project was significant.

During the Development stage, project staff and Design Committee members worked together to plan the pilot test program, including the steps necessary for implementation. While environmental education was viewed as being most effectively and meaningfully conducted in the context of real life, it became apparent that planning and coordination activities necessary to provide such a context required a good deal of staff time from both agencies. It was also found that, to be successful, forming linkage arrangements between programs requires a certain level of existing program development. Some project effort became necessarily diverted to that concern.

During the Implementation stage, members of the Design Committee carried out the six-week pilot test program. Within the context of environmental education, the pilot programs focused on energy and land use, with consideration of related economic issues. Individual and group programs conducted by the Design Committee members covered a wide range of activities and grade levels. Examples include: a second-grade class went on its first overnight camping trip, supervised by a team of Scouts who presented environmentally-related games and activities; Scouts at a new middle school assisted in the development of a special outdoor education area and, in the process, earned credit toward an Eagle Badge and Scout service awards; teachers used environmentally-related Scout materials in classrooms and libraries; high school students, trained in marine biology, led a group of Scouts through monitoring activities at a special school marine site; and staff members of both organizations exhibited a willingness to cooperate and coordinate programs.

An additional program was conducted in connection with the linkage project in career education funded by SCOUTING/USA. This program consisted of a series

of events that provided a group of students/Scouts with experiences relevant to careers in energy and land use. The students/Scouts took field trips, heard speakers, and participated in activities that enabled them to fulfill environmentally relevant Scouting requirements and to make contributions to school classes.

Some of the programs were judged expensive in terms of staff time and effort, and thus provided a cautionary note that potential demands on personnel be an important consideration in thinking about linkage plans. However, programs were judged by student/Scout participants, selected parents and teachers, and Design Committee members as generally successful.

Also during the above three stages (Design, Development, and Implementation) project staff produced a document that contributed to the linkage process. A Study Report was prepared, analyzing the environmental education content of the materials and programs of SCOUTING/USA -- as the representative nonformal agency -- as compared to a representative set of environmental education objective statements. The document grew out of the generic linkage model step during which the goals and objectives of the agencies seeking linkage were compared for overlap.

The Evaluation stage, ongoing throughout the year, provided information for decision-making in the course of the project and for judging the overall worth of the project outcomes. Information was collected by such means as questionnaire interviews, daily logs, observations, and the Design Committee meetings where opinions, attitudes, experiences and ideas were expressed.

Throughout the project, Design Committee members were asked to play their roles in a self-conscious manner; that is, to constantly examine, record, and evaluate their actions and thoughts with respect to the linkage process in which they were involved.

The final stage of the project, Forward Planning and Reporting, focused on the documentation of the findings; the development of the final specifications for the generic environmental education linkage model, detailing linkage costs, benefits and steps; the description of the application of the generic model to the Alameda pilot test situation; the setting forth of recommendations for environmental education linkage emphases in the total educational community; and the preparation of the final version of the study report. All of the above are reported on in this document.

In general, findings of the project indicate that benefits can be obtained through linkage arrangements between the environmental education programs of the formal and nonformal educational sectors and that each sector can gain from and contribute to such an effort. Some linkage efforts can be built upon existing linkages and, in other areas, new exchanges can be worked out.

The schools in our pilot program, for example, found that environmentally relevant content can be obtained through Scouting literature, notably through the Merit Badge Pamphlets, and they welcomed the use of these materials in their school libraries and classrooms. This arrangement provided Scouting with an extended environmental education program. Staff members of both organizations seemed to be more receptive to the other organization as a result of the interaction that occurred during the project.

Project results indicate several areas in which linkage and environmental education efforts could continue:

- The linkage model could now be tested in other cooperative arrangements across the country. Specific procedural guides could be developed to facilitate those arrangements.
- A training program could be developed for educators who are interested in working with linkage. The program would offer instruction in linkage goals, strategies for attaining them and practical techniques for carrying them out; and in decision-making and problem-solving skills.

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PART ONE

REPORT ON THE PROJECT

SECTION I: OVERVIEW OF THE PROJECT

A. Problem, Purpose and General Approach

B. Project Goals and Objectives

C. Project Phases

D. Interactions Between Far West Laboratory and National Scouting/USA Staff

SECTION II: A DESCRIPTION OF THE PROJECT

A. Research, Analysis and Model Design

B. Pilot Activities

C. Evaluation

D. Findings, Analysis and Interpretation

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SECTION I

AN OVERVIEW OF THE PROJECT

The problems and purpose addressed by the project and the general approach that was followed in carrying it out are described below. Project goals and objectives are stated, the relevant capabilities of participating agencies are specified, and the results and benefits emerging from the cooperative effort of these agencies are identified.

A. PROBLEM, PURPOSE, AND GENERAL APPROACH

Education is more than schooling. The development of young people and the continuing development of adults is fostered by learning experiences in all facets of life. Beyond the boundaries of the school, formal and nonformal opportunities for learning emerge in the home; in peer, neighborhood, social and religious groups; through community, youth, and adult agencies; through private and public employers; through the media and in many everyday life situations.

These educational opportunities and efforts have been fragmented and separated from the school and from each other, even though research findings* in the domain of interagency cooperation suggest that linkage and integration of

*Aiken and Hage, 1968; Aldrich, 1974; Beal, 1972; Boyce, 1972; Dillman, 1966; Finley, 1967; Halpert, 1975; Katz and Kahn, 1972; Klonglan et al., 1972, 1974, and 1975; Rogers, 1972; Warren, N.P.; Young, 1965; Zimmerman, 1973.

similar efforts may generate benefits well beyond those produced by the total sum of separate efforts. Powerful potential could be tapped by creating an alliance among sectors of the community and the society that are interested and involved in education.

1. The Problem

The image of a broad-based view of education -- suggested above -- was clearly articulated in the Fiscal Year 1976 program statement of the Office of Environmental Education. In defining General Projects, the statement said that in this category, financial assistance could be awarded to projects designed to assist the development of effective environmental education practices and materials suitable for use by formal and/or nonformal education sectors. Non-formal education sectors were defined as "public or nonprofit private agencies or organizations which contribute, directly or indirectly, to the education of citizens" (e.g. Scouting, 4-H, Sierra Club).

In establishing the criteria for awards, the project statement added that (a) the project design should "facilitate student/participant involvement with local environmental problems and issues outside the formal education structure;" and (b) the project should address "problems and resources which are relevant to the lives and experiences of the participants and will encourage exploration of community environmental problems and use of community resources for the purpose of achieving individual as well as group understanding."

In specifying financial assistance and grant support, the program statement stipulated: "When individual citizens, community groups, and public and private institutions are developing their own local, regional and national (environmental education) programs, there should be available to them a variety of tested, relevant, and usable models that they can use or adapt to provide structure, process, and substance to various key aspects of their particular program. These

models would include curriculum, source material and methods for training educational and noneducational personnel. Therefore, the office supported projects which promised to be successful in meeting the local need for which they were developed, but that were also applicable to program development needs in other locations and nationally."

At the present time, formal education is functionally separate from nonformal education and the schools' potential for linking with other educational sectors of the community has not been developed. Environmental education calls for such integration and linkage. In fact, the only effective and meaningful way to conduct environmental education is in the context of real life, so that use is made of environmental issues and situations that relate to the community and to the larger society while still being personally relevant to the individual.

Environmental education, by definition and by philosophy, implies dismantling the barriers that have separated formal education from nonformal educational opportunities, situations, resources and experiences. Environmental education thus invites an interface, a linkage, and eventually an integration of environmental education efforts in the schools with environmental education efforts in numerous community-based nonformal education sectors. This kind of holistic view of environmental education implies the identification, organization, and use of as many educational resources as can be found in the nonformal as well as formal sectors.

In order to identify the problems and needs to be addressed, we reviewed the report of the Environment Based Education Project.* The report stated that environmentally-oriented nonformal education sectors have played a significant role in the development of national environmental consciousness, but pointed out that the program of these sectors represented only a portion of what is characterized as environmental education in the Environmental Education Act of

*Arizona State University Center for Environmental Studies and Association of American Geographers, June, 1975.

1970. Furthermore, the report said that there was a lack of coordination and cooperation among the various sectors involved in environmental education.

2. The Purpose

The project outlined in this report sought solutions to the problems introduced above. We recognized the fragmentation of many educational efforts and the potential in their integration. We also recognized that (a) environmental education, by definition, is a collaborative effort between the school and other segments of the community, and (b) nonformal educational agencies have much to offer to the advancement of environmental education. Accordingly, the overall thrust of the project presented here was to strengthen and improve this collaboration and to design, develop, and test a generic model for linking and integrating environmental education in schools with the programs of environmental awareness-oriented nonformal education sectors.

The mandate for the model called for: (a) a display of procedures and organizational arrangements for linkage and integration of environmental education programs of formal and nonformal education sectors; and (b) guidelines for planning, implementing, and evaluating the procedures and arrangements. The proposal called for a model which was generic in nature in that it could be used for linking the formal education sector with a variety of nonformal education sectors.

Implementing the linkage and integration procedures and arrangements defined by the model would facilitate an exchange of concepts and approaches between the formal and nonformal sectors involved in environmental education and would enhance the effectiveness of such programs and their personnel. In demonstrating the linkage between and the integration of formal and nonformal education sectors, the model would also show the social and educational benefits that accrue from such linkage and integration. Specific guidelines

for accomplishing linkage of the formal and nonformal education sectors on an ongoing basis was to be included in the model as well.

3. The General Approach

The project was carried out in one year. During this time, the linkage and integration model was developed in conjunction with a selected local educational agency and a nonformal educational agency that is national in scope. In future projects, the model can be introduced in the context of other nonformal educational agencies in order to test its generic property and its range of applicability. In addition, a training program could be designed that would facilitate the linkage coordination process.

The project, by its nature, called for the involvement of various educational agencies. Accordingly, the project was carried out through the combined efforts of a consortium of several agencies. The Far West Laboratory for Educational Research and Development was the facilitator organization. The Laboratory, a nonprofit public agency, has a major commitment to improve the quality of human life and to create better opportunities for learning. The Laboratory has developed numerous educational products and programs, directed at stages of educational development ranging from and including early childhood to graduate level and professional development programs.

During recent years, Far West Laboratory has studied linkage arrangements between formal and nonformal educational agencies that are national in scope.* Of the participating nonformal educational agencies, SCOUTING/USA proved most cooperative. Hence, Far West Laboratory actively sought and gained the interest and cooperation of the national leadership of SCOUTING/USA in developing this

*Bela Banathy, et al. A Study of External Training Settings Available to Diffuse Civil Preparedness Public Instruction. San Francisco, CA.: Far West Laboratory, 1975.

proposal and helping in the implementation of the linkage arrangements introduced here.

SCOUTING/USA was represented at the national level by the national Director of Conservation who served as a consultant to the project, and by representatives of the three levels of Exploring, Scouting, and Cub Scouting; and on the local level through the participation of the Alameda Scout Council.

The local educational agency was selected from those that were already in a cooperative relationship with the Far West Laboratory. The selected agency was the Alameda Unified School District.

Alameda is a community of 75,000 people located in the San Francisco Bay Area. It is served by a school district that educates approximately 10,000 students and includes two high schools (grades 9-12), one continuation school, five middle schools (grades 6-8), nine elementary schools (K-5), and one children's center. Adult education is also offered. The ethnic break-down of the student population is as follows: White = 7,162; Asian or Pacific Islander = 1,856; Hispanic = 800; Black = 506; and Native American (including Alaskan natives) = 90. The presence of a large naval base in the community contributes to the special problem of a high rate of student turnover.

B. PROJECT GOALS AND OBJECTIVES

The Far West Laboratory, SCOUTING/USA, and the Alameda School District joined in a cooperative effort to advance environmental education by creating a model for formal linkage between the formal and nonformal education sectors. The goals and objectives of this effort are outlined below.

1. Project Goals

There were four project goals:

Goal 1: Design a linkage model and component means and methods for facilitating the linkage and integration of formal environmental education programs in schools with the programs of environmentally-oriented nonformal educational agencies.

Goal 2: Implement the linkage model and:

- infuse* formal environmental education curriculum content and approach into the programs of nonformal education sectors, and;
- infuse some of the nonformal environmental education program content and approaches into the curriculum of the school.

Goal 3: Design, develop, and validate cooperative and mutually supportive instructional management arrangements between formal and nonformal environmental education programs and personnel in order to facilitate the attainment of Goals 1 and 2.

Goal 4: Describe the linkage model and report findings relevant to the attainment of Goals 1, 2, and 3 in order to make the model accessible to communities and nonformal educational agencies across the nation.

The emphasis throughout the program was on the description of strategies that would result in more than a report on the mechanism for making the model accessible to users nationwide. The model builders attempted to initiate actual organizational constructs that would overcome the resistance to the accomplishment of real change in the target population. This was the specific focus for Goal 4.

2. Enabling Objectives

The goals described above were attained by accomplishing the following specific objectives:

- Analyze the overall aims, programs, and organizational (institutional) characteristics of : (1) environmental education in formal educational settings; and (2) the nonformal educational setting of SCOUTING/USA.
- Define the extent to which there is goal and program overlap and congruence in organizational and other institutional characteristics.

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*integrate a program or the content of a program into already-existing programs or curricula.

- Based on findings, design a generic linkage model and construct alternative configurations of that model for mutual program linkage and program integration.
- Specify program means, methods, and procedures that implement linkage and program integration.
- Outline a plan for pilot implementation and testing.
- Implement and test the program linkage in pilot settings.
- Assess program impact.
- Report findings of pilot implementation.

C. PROJECT PHASES

Major stages of the Environmental Education Linkage Project included:

- Research and Analysis.
- Design.
- Development.
- Implementation.
- Evaluation.
- Forward Planning and Reporting.

The Research and Analysis stage provided the information/knowledge base needed for the design of the linkage/integration model. During this first stage, the knowledge base for the project and definition of goals, programs, and organizational characteristics of formal and nonformal education agencies was established. Action in this task area was initiated by Far West Laboratory with the project staff developing specifications for the information and participating organizations supplying the relevant information.

The project staff also analyzed the available data on the objectives, program and organizational characteristics of school and Scouting environmental education

projects in order to determine the nature and scope of goal and program overlap and to specify areas where overlap did not exist or was only marginal. Findings were shared with participating agencies for their comments and validation.

During the Design stage, a description and an overall specification of the components of the environmental education linkage/integration model began. At this stage, design work on the generic model for linkage began. A study of overlapping as well as unique goals and program domains led to the consideration of various goals and the selection of emphases and program additions and adaptations. Based on these concerns, a set of alternative linkage/integration configurations emerged. These alternative models were then submitted to representatives of participating agencies for consideration.

The third stage, Development, identified the means and methods by which the program could be activated and linkage and integration could be implemented. First, resources and descriptions of the procedures that would be used to implement linkage were gathered. An overview of SCOUTING/USA's environmental education program was derived from an analysis of their environmental education-related materials and programs at the national level. A survey of resources at Alameda Unified School District provided information used in considering and selecting the resources which might be used in the pilot program of linkage/integration. Information was also obtained by identifying critical areas where materials and resources were not available.

Next, plans and arrangements for the introduction of Pilot Testing were developed in coordination with the participating agencies. At the national level, the linkage pilot program was developed with the involvement of members of the national staff of SCOUTING/USA. At the local level, arrangements were made with representatives of Alameda Schools and of the Alameda Scout Council.

During the Implementation stage, linkage/integration programs were introduced in a pilot setting for a period of six weeks in order to make an initial assessment of the applicability of the model.

Component tasks of this stage included:

1. The orientation of: (a) school staff and students at participating schools; (b) community representatives; and (c) participating local Scout Councils and Scout units.

2. The introduction and operation of a pilot-program, limited in scope but with all the essential elements of the linkage/integration model.

The Evaluation stage, ongoing throughout the project, involved overseeing and monitoring the design, development and implementation phases and provided information for (a) decision making in the course of the project (formative evaluation) and (b) judging the overall worth of product outcomes (summative evaluation). Design evaluation was accomplished at various levels and included youth, parent , and professional representatives from the participating agencies.

The final stage, Forward Planning and Reporting, included the final development of a linkage/integration model, the requisite procedural guides, the report of findings, and recommendations for future research and development efforts in the area of interorganizational linkage.

D. INTERACTION BETWEEN FAR WEST LABORATORY AND NATIONAL STAFF OF SCOUTING/USA

Interaction occurred between Far West Laboratory project staff and the national staff of SCOUTING/USA throughout all phases of the project. The principal representative of the national staff was Mr. Ted Pettit, Director of the Conservation Service, who served as an invaluable consultant to all phases of the project. Early in the project, project staff met with Mr. Pettit and with the Director of SCOUTING/USA's Program Development, Mr. John Larson. At

that time, plans were made concerning the involvement of the national staff. It was agreed that SCOUTING/USA would provide the project with materials relevant to their environmental education program. It was also agreed that the national staff members would initiate contact with local SCOUTING/USA units. Specifications for the project time frame and the contributions of the national staff were made.

Mr. Pettit provided names of contact people in environmental education areas relevant to the Scouting program, and specifically facilitated an invitation for a project staff member to attend the North American Regional Seminar on Environmental Education, October 5 to 8, 1976, in St. Louis, Missouri. Throughout the project, Mr. Pettit provided a wealth of information and materials. He made several trips to Far West Laboratory to work with project staff, contributing during his visits to the conceptualization of the model and to its practical interpretation in the Alameda project. On these visits, he met with the Alameda Design Committee to provide national input to their pilot program.

In October, 1976, Dr. Bela Banathy visited SCOUTING/USA headquarters to present a seminar to key staff on linkage systems.

In January, 1977, Project Coordinator Dru Robinson visited the SCOUTING/USA headquarters in New Jersey. Although the visit was sponsored by the career education linkage project, information was also exchanged regarding the environmental education project. National staff members who participated and who later visited Far West Laboratory were: Mr. Forrest McVicar and Ms. Audrey Clough, Associate Directors of Exploring; Mr. Richard Dutcher, Associate Director of Scouting; and Mr. Russell Williams, Associate Director of Cub Scouting. When these staff members visited the project, they attended Design Committee meetings, contributed to the model development, and provided input regarding national application of the model on the three levels of SCOUTING/USA.

SECTION TWO

A DESCRIPTION OF THE PROJECT

Project phases discussed here include research, analysis, model design, pilot test activities, and project evaluation. The findings and their analysis and interpretation are also reported on here; and recommendations for the future are made.

A. RESEARCH, ANALYSIS AND MODEL DESIGN

The intention here was to establish the information/knowledge base required for designing the linkage model. An extensive literature search of relevant articles, periodicals, and books yielded information that provided the basis for the selection of the generic characteristics of the linkage model and, further, for design of the model at more specific levels of application.

A report on the results of the literature survey summarized these findings according to two general categories: (1) coherence: Are the set of operations defined clearly? Are they useful? Are they connected to each other by a logical tissue that constantly and purposefully directs them to the specified (linkage) end? and (2) adaptability: Is the model sensitive to new information and new needs? Can the structure adjust or regenerate itself without losing power or significance so that difficulties may be resolved or the appropriate ends achieved?

Within these two general categories, the literature review delineated some further requirements for successful interagency linkage at various levels of specificity. For example, the need for considering the social, political, and

economic contexts of the participating organizations encompasses the simplest and most obvious first step for linkage -- i.e. finding past linkages that were effective.

In addition to the report on the literature survey, which served as an important source for designing the linkage model, a series of four papers (by Dr. Bela Banathy) related to alternative design methodologies for constructing linkage models and programs was distributed to linkage project staff and Design Committee members. One paper, "The Design of Institutional Programs for Linkage," was selected as the statement of design most appropriate to the program development level of this project.

B. PILOT ACTIVITIES

The Unified School District and the local Scout Council of Alameda were identified as the representative agencies for the pilot program. Participating agencies were selected through the cooperation of the national staff of SCOUTING/USA (for the nonformal sector) and the district level of the Alameda School District (for the formal sector).

The Scouting participation, initiated on the national level, was arranged through the Golden Gate Scouting Consortium -- an organization of Bay Area Scouting groups. The Alameda Scout Council Executive invited members of his volunteer staff to participate in the program.

In the Alameda School District, initial contact was made with the Superintendent of Schools, who then enabled the project staff members to meet with district level personnel. Those district level people (the Assistant Superintendent in Charge of Educational Services and the Coordinators responsible for the Environmental Education and Career Education programs of

the district) then coordinated the selection of district schools and personnel participating in the project.

Pilot activities for this project occurred on two levels: Design Committee and program.

1. Design Committee Level

The Design Committee consisted of seventeen people representing the Alameda School District, the Scout Council, and Far West Laboratory. Meeting in a series of design meetings, the tasks of the committee included: contributing significantly to design of the linkage, carrying out the linkage program development, and implementing the linkage program.

Committee members were selected from various levels of the participating organizations. Representing the Alameda Unified School District were teachers from each school level (elementary, middle, and high school), counselors, a school vice-principal, and district administrators. Substitute teacher time was paid for by the project.

The local Scouting representatives included the Scout Executive and volunteers working with the divisions within Scouting (such as Exploring, which is a high school level program). Mr. Ted Pettit, the national Director of Conservation Services for SCOUTING/USA and the other national staff members attended throughout the year.

It was recognized early that attendance at the daytime Design Committee meetings would be difficult for Scout leaders, because of their work commitments. Therefore, a part-time Scout liaison worker was employed by the project to convey information and to coordinate plans between school and Scout participants.

Eight all-day Design Committee meetings, involving all members, were held. Various other meetings, involving smaller groups, were called when group members indicated a need.

During the first Design Committee meeting, an Outline of Project Phases was presented. It was stressed that the events occurring in each stage would depend upon feedback from the last phase. At this first meeting, the concept of linkage was introduced. Ideas implicit in linkage, as well as potential costs and benefits, were examined. A need for cooperation, interdependence and resource sharing was established. Stated as points to examine further were:

- communications;
- community needs;
- boundary imperatives;
- personal commitments and how to develop them; and
- potential inequalities and conflicts.

Many of the important components of a systems approach to education were recognized. However, clarification of the goals of each of the participating organizations and how they relate to the general interest of the learner was needed.

At the second Design Committee meeting, members addressed themselves to the previously stated need for clarification of the goals of the participating agencies (the Alameda Unified School District, Far West Laboratory and SCOUTING/USA). and how these goals relate to the general interest of the learner. Each committee member in turn spoke about personal and organizational interests, needs, resources, experiences, and perceptions of linkage.

Discussion again turned to linkage concepts such as a further definition of linkage; the ways in which the uniqueness of an organization entails the uniquene of organizational linkage; the facilitator and the role of boundary personnel; and the structure of the linkage systems.

Those who attended the second Design Committee meeting recommended that develop ment eventually include a professional development component. It was agreed that

Far West Laboratory would integrate knowledge and resources from related projects (e.g. Environmental Education Teacher Training Models and Experience-Based Career Education, a national model developed by the Laboratory). A 1976-77 school calendar, noting significant dates in the school year, was circulated to help the Design Committee plan for future meetings. It was suggested that the pilot test operate from March 14, 1977 to April 29, 1977.

The third Design Committee meeting opened with a slide and sound presentation of the Far West Laboratory Experience-Based Career Education project. Information presented eased the concern of some committee members about making the transition from the theoretical aspects of model development to the practical aspects of program development. Members also received a progress report on the state of a project phase involving the comparison of formal and nonformal and national and local goals, objectives and structural characteristics of SCOUTING/USA and public schools on both a national and local basis. These comparisons were undertaken by Far West Laboratory as part of the model development.

Committee members then returned to the topic of personal and organizational perceptions of linkage. Both school and Scout representatives reiterated their interest in working together and their concern over such items as insurance, sharing of information, legal considerations and supervision.

The rest of the session was largely devoted to discussion of the design process which the committee would use in creating the institutional linkages. Among the topics discussed were legal and fiscal constraints; the need for clearly defining goals, objectives and linkage expectations; and the need for continuous self-evaluation (correction and adjustment) and self-criticism of the functioning of the linkage. Also, the role of boundary personnel or linkage management, systematic implementation arrangements, reward systems and provisions for conflict management were broached. One point stressed in the

coarse of a complex discussion was that Far West Laboratory perceived linkage as a way in which organizations can respond to the entire community and its resources. Also, the role of the Design Committee was again clarified and representatives from the school district, the Scout Council and Far West Laboratory discussed the allocation of role responsibilities for developing and implementing activities during the pilot phases of the program.

In an attempt to further delineate the responsibilities of the Design Committee, a memorandum was distributed to members before the fourth meeting stating that the meeting's purpose would be "to gather ideas and make some choices for the instructional arrangements -- and the resources needed to carry them out -- for a joint Alameda Schools/SCOUTING pilot program in energy and land-use areas of environmental education and environmental careers." For the purpose of planning, Design Committee members were asked to think in terms of the following interrelated levels:

- High Schools and Explorer Scouting.
- Middle schools and Scouting.
- Elementary schools and Cub Scouting.

Far West Laboratory presented a number of idea papers at this meeting, including one paper that dealt with establishing ethical and aesthetic objectives for environmental education on the elementary, junior, and senior high school levels. After receiving this information, Committee members were eager to meet in small groups according to their major interests in the areas of environmental education and environmental careers. At this point, too, the existence of major attitudinal and operational differences between school representatives with environmental education and environmental career orientations became apparent.

In the course of discussing several topics, the environmental careers group agreed upon the importance of awareness, as a first step, on both teacher and student levels. Teachers, for example, would need to be made aware of the value of the Scout program. Strategies suggested to accomplish this included

offering teachers a class, workshop or in-service training to explain how the Scout program can coordinate with the school program; emphasizing the benefits of the Scouting program during teacher orientation sessions and disseminating an informational packet. It was pointed out that if students gathered material for such an informational packet, their awareness of the advantages of participating in a Scout program would increase as well. It was also recognized, however, that some students might hesitate to openly support such a program because of peer pressure. Another suggested strategy that would increase awareness on both levels was that of presenting the Scout program at a school assembly.

Discussion then turned to the important advantages that would accrue to organizations participating in the project. Representatives from the public school system perceived the linkage project as an opportunity to receive excellent materials (Merit Badge Pamphlets) for use in the classroom. Also, the school/Scout linkage was perceived as a way of individualizing instruction. Scout representatives looked forward to sharing this material with the school for several reasons. First, they evidenced the hope that the barrier of exclusivity that has surrounded Scouting would diminish and second, they saw the school system functioning as a disseminator of Scout information. It became apparent, then, that representatives of both groups would be pleased to see Scout materials used in career centers as well as in classrooms. The possibility of Explorer Scout activities qualifying students/Scouts for school credit was also discussed, as was the possibility of greater parent participation in both school and Scout programs.

Meanwhile, the Environmental Education interest group was ready to begin program level development. Members of this group drafted the following list during their meeting:

Goals

Outdoor education
Land use (pollution, agriculture, economics, conservation, urban/rural planning.)
Energy

Linkage

Cross tutoring (from school to Scouts; from Scouts to school)
Materials available
Scouts as teachers
Scout credit for school activities
School credit for Scout activities
Collective project (film)
Community relations (sharing joint projects with a wider community via Scout connections)
Capitalize on Scout mobility (use insurance coverage?)
Teacher/Scout-leader liaison

Objectives

Environmental education fair
Spiral growth
Older Scouts to lower grades
Cub Scouts in lower grades
Understanding the interdependence of ecosystems
Topography vis-a-vis land use
Energy awareness starts at home
Limits of energy consequences
Plant uses
Human energy
Historical overview of area
Pollution/depletion/resource recycling
Water and plant dependency
Soils (differences and as a resource)
Community use
Community and regional park use

During the fifth meeting, Design Committee members continued the program level development begun the week before. For the Environmental Careers interest group, a document entitled Career Education Model K through 14, prepared by the Marin County Industry Education Council and published by the San Rafael City Schools in Cooperation with the National Alliance of Businessmen, was used to focus attention on goals. Members of this interest group compiled the following list:

Goals

Career awareness
Self awareness
Appreciations and attitudes
Decision making
Economic awareness
Skill awareness, beginning competence
Employability skills
Educational awareness

Linkage

Cross tutoring/training
Share materials
Scout credit for school activities
School credit for Scout activities
Collective project
Community relations/recruitment
Sharing joint projects with wider community via Scout/school connections
Capitalize on Scout mobility (insurance?)
Teacher-Scout leader liaison

Objectives

Awareness of careers of family and friends
Perception of careers as clusters
Familiarity of tools and how to use them
Get student to take responsibility for self
Giving students realistic expectations

Activities

Scout presents career/cluster
Career fair
Guest speaker
Field trip
Identification of career possibilities in community jobs in energy and land use

While the Environmental Careers group worked on this list, members of the Environmental Education interest group met separately to refine the list they had begun earlier.

Before separating into interest groups at the sixth meeting, Design Committee members were asked to think about an overall evaluation plan. Far West Laboratory representatives indicated that evaluation would be conducted on both Design Committee and program levels. To guide the Committee's assessment

of the Overall Evaluation Plan, Far West Laboratory suggested the following categories:

1) Comprehensiveness

- What additional information should be sought?
- What additional sources of information should be used?
- Are there additional times when information should be gathered
- Are there additional methods of gathering information that should be used?

2) Feasibility

- Are there too many evaluation requirements for the Design Committee?
- Are sources appropriate for information sought?
- Will the presence of observers interfere with school/Scout program procedures?

3) Usefulness

- To what extent will timing and type of information sought be useful in model and program design?
- What is the anticipated usefulness of impact evaluation for improving the program, procedural guides, etc.?

4) Validity

- What are the methods and means for gathering information likel to produce meaningful, significant information?

5) Recommendations

- What are the recommendations for revisions in the evaluation plan?

Before dividing into smaller groups, meeting participants also discussed the approximate date of the pilot test. It was confirmed that the best time would be March-April and that the test would run six weeks. In anticipation of this, teachers were asked to request the necessary materials, which Far West Laboratory would purchase with project funds in early February. The Committee then split up into Environmental Education and Environmental Careers interest groups and each continued their program development efforts.

Before the seventh meeting, Committee members were notified that representatives of the SCOUTING/USA National Staff would attend. Also, Far West Laboratory suggested that major efforts be concentrated in the following areas:

1) Evaluation Plan

- Complete selected evaluation materials, answering questions about the process used to plan the pilot program; and,
- Consider ideas for the evaluation of the pilot program itself.

2) Goals and Objectives

- Look at the goals and objectives of Scouting and the public schools in career education and in environmental education on the national and district levels to determine overlap, and application to the pilot program.

3) Pilot Program Planning

- Continue planning with special attention to feasibility and public relations.

Again, the major portion of the meeting was spent with committee members separating into their primary interest groups. Before the Committee divided, however, national level representatives from SCOUTING/USA were introduced, the Committee members were brought up to date on the activities of the Scout liaison member, and the possibility of producing an audio-visual presentation on the linkage process was discussed. At this meeting, committee members finished program level development and received evaluation instruments.

Representatives of participating agencies in the Design Committee meetings were not only largely responsible for the design of the linkage process and of the pilot program, but also contributed several important steps in developing the linkage model.

First, Far West Laboratory utilized these meetings as a base from which to introduce and disseminate information on the concept of linkage itself. Second, tentative but significant personal contact between boundary personnel was

established. Third, information was shared between the Scout Council and the Alameda School District regarding available and potential means, tools, and resources that could be components of a pilot program of linkage/integration. Fourth, specific interest areas and program plans were developed.

2. Program Level

A major part of Design Committee effort was devoted to the development and construction of the pilot program. This involved the consideration of various means, tools, resources, methods and procedures. It also involved the identificat of critical means, tools and materials not yet available. Plans for the introduction of pilot testing were put into final form and specific arrangements for the implementation of those plans were made.

The Scout liaison member of the Design Committee contacted leaders at several Scouting events. Response was positive, and necessary arrangements were made for coordinating interaction between these Scout leaders and school personnel.

Publicity for the program was secured through the local newspaper and through such service organizations as the Rotary Club. Interest on the part of teachers, students, parents, Scout volunteers and Scouts was thus generated.

Design Committee members formulated plans for two general program areas, both of which emphasized energy and land use. One program, however, placed primary importance upon several interrelated environmental education programs and the other, upon a group-organized program in Environmental Careers. For the latter, the collaborative strategy that evolved was entitled "The Alameda Community Career Awareness Project" (ACCAP).

This ACCAP program focused on careers in energy and land use and included relevant field trips and speakers. It was decided that the student participants would be selected through the Alameda Scout Council and, for purposes of the

pilot program, would be limited to 25 students at the middle and high school levels. Scoutmasters were informed of the program and Scouts were invited to participate.

By involving themselves in the program, Scouts could earn partial completion certificates for the Environmental Science Merit Badge as well as other related badges and skill awards. With more intensive participation in the program, Scouts would be able to complete the Environmental Science Merit Badge requirements during this six-week period.

Tasks related to implementing the pilot program included:

- clearing all plans with local school administrators (district level personnel and principals);
- sending letters to parents of selectees before the start of the program;
- checking insurance coverage with the Scouts;
- selecting agencies and speakers for field trip visits and making school presentations (agencies considered included The Bay Model, a Marine Ecology Research Facility, the local power company, a nuclear power plant or nuclear-powered ship, a solar-energy demonstration house, and a National Audubon Wildlife Study Area);
- arranging an orientation meeting for participating students and their parents;
- conducting a study of the Scouting requirements to determine exactly what participants can gain from the pilot program that could contribute to their advancement in Scouting; and
- arranging transportation.

School and Scout personnel worked together to handle the arrangements of the pilot program plan. The overall coordination for the program was handled by one high school counselor, who supervised the Career Education Center in his school. In that position, he also supervised a new paraprofessional in charge of daily operation of the Center. As part of her training process, the paraprofessional assisted in the coordination of the Environmental Careers plans.

Both organizations planned to contribute resources. For example, Scouts had an excellent insurance program that covered the students on field trips as well as providing experience in organizing teams of parents to offer transportatic Thus, they were responsible for those aspects of the program. The school, on the other hand, provided such facilities as the above-mentioned Career Center for the Orientation Meeting; and such staff as the paraprofessional in charge of the Center.

Since the last week of the pilot program coincided with Public Schools Week in Alameda, the pilot program was featured in a display in the high school Career Education Center.

In summary, the major linkage activities included:

- Use of school and Scout facilities and resources to plan and conduct an environmental careers program (ACCAP). Although this year's program had an environmental emphasis, it was hoped that additional areas would be explored in the future.
- The project provided students/Scouts with a series of events, exploring environmental careers, utilizing speakers, field trips, and experiential activities.
- Use of Scouting literature--especially Merit Badge pamphlets--in the Career Centers at both Alameda and Encinal high schools and in selected classrooms (of Design Committee members) at all three levels (high school, middle school, and elementary school).
- Students in a special marine ecology class at Encinal High School taught Scouts techniques for monitoring the Bay.
- Use of Scouting's insurance plan to cover students involved in joint school/Scout career education activities.
- Use of the Career Center at Encinal High School to display Scout posters and literature, especially during Public Schools Week at the end of April.
- Scouts who had participated in the linkage programs made classroom presentations in other classes as well as in their own. In some instances, this required their going to other schools.

In addition to the ACCAP program, five individual programs were also piloted. For ease of reference, the programs will be identified by the name of the school in which they were conducted.

The program at Otis Elementary operated with the following goals and objectives:

- To share and learn from cross tutors, reports, etc.
- To utilize previously unused resources in a school setting; i.e., the Scouts and some of their facilities.
- To learn and become aware of concepts relating to land use and energy at the students' level.
- To provide a vehicle to aid the Cub Scouts or Scouts in their programs; e.g. earning Merit Badges.

The teacher at this school utilized students from Lincoln Middle School classes, who were also Scouts, in a cross-tutoring effort. An overnight camp-out was planned and carried out with her second grade class and selected Scouts from Licncoln. Acting as mini-teachers and group leaders, the Scouts helped prepare students for the trip, supervised them during the overnight and presented follow-up activities later in the semester.

Major emphasis during the pilot program was placed on land use. Otis Elementary School PTA-based Cub Scouts enriched their Cub Scouting program by sharing land-use activities, projects and art lessons with the class. The teacher reported that interest was generated throughout the school concerning Cub Scouting.

Among the materials that were introduced to the class was a filmstrip on energy, which proved too difficult for second graders. Another book, suggested by a Design Committee member, turned out to be more successful in introducing energy concepts. A conservation poster published by SCOUTING/USA and a water district booklet entitled Water Play were also successfully integrated into classroom activities.

In a program involving the sixth-grade class at Longfellow Middle School, energy was the primary focus and conservation the key. Major program goals in these areas included the following:

- Students would become familiar with the importance of our resources.
- Students would become aware of alternatives to the present waste of our resources.

- Students would become aware of the food chain and how it affects them.

Materials used included a set of environmental materials published by the Lawrence Hall of Science, Berkeley, California. During the pilot program, the class also observed Wildlife Week and studied conservation and mapping with aid from Scout assistants.

This teacher also conducted a second classroom-based program at Longfellow Middle School focusing on, but not limited to, careers in environmental education. School/Scout linkage activities in this program included:

- Use of Scouting's personal growth agreement in the classroom.
- Use of a JOB-O career-interest survey to match career selections with feelings and interests of students and Scouts.

Goals for this career education program were:

- Through use of JOB-O and a computer program, students would learn about careers for which they would be suited.
- Students would have an increased awareness of:
  1) career possibilities;
  2) career requirements;
  3) career availability in the future; and specifically,
  4) career opportunities in conservation.
- Students would explore a specific career and report their findings to the class.

Materials used included When I Grow Up: Discovering Careers Through Self-Directed Activities by Linda Schwartz, consultant for the Gifted, Goleta Union School District, Goleta, California.

Activities included matching job titles with duties performed and searching the classified section of newspapers for a variety of job types (e.g. day vs. night, standing vs. sitting, indoor vs. outdoor).

The major linkage activity involved three student/Scouts who, after learning about and taking the JOB-O in class, administered it to their fellow

Scouts at a troop meeting.

A list of goals and objectives for the environmental education program at Lincoln Middle School included:

- Children would become aware of their natural environment as it relates to conservation and energy. They would be aware of:
  1) differences between native and non-native plants.
  2) the food-chain, its balance and how we affect it.
  3) how we obtain our energy and the alternatives for energy conservation.

- The above included sharing and learning from other organizations, with Scouts acting as leaders in feeder schools and Scouts building animal cages and caring for animals.

In this program, the following concepts as they related to energy/conservation were emphasized:

- All living things are affected by their environment.
- Living things are interdependent with each other and with their environment.
- Living things are in constant change.
- The universe is in constant change.

Major linkage activites in this program included:

- Teacher announced to students that she would serve as a Merit Badge counselor.
- Scouts led field trips to EBMUD.
- Scouts were aides on the Otis Elementary overnight. They supervised second graders and presented environmentally-related classroom activities.
- Scouts helped develop the outdoor area at Lincoln School, under the supervision of a teacher and volunteer parent. In doing this, Scouts received credit for service projects, enabling them to fulfill some requirements for earning a Citizenship in the Community Merit Badge and for attaining Star and Life ranks.

This semester, the teacher used the Scout Conservation Chart along with her previously-gathered Project Learning Tree materials and found that the two coordinate well.

The overall goal of the program at Haight Elementary School was "to offer those students involved in linkage a greater sense of basic goals in life that

transcend individual institutions. By having environmental values reinforced in school and in the linking organization, the student will learn that he/she is the carrier of values and not an object tossed among divergent values and institutions."

The teacher worked with Alameda's Troop #1 and her own sixth-grade class. Activities included:

- an overnight for her class;
- work with Scouts wishing to fulfill requirements for energy and land-use-related Merit Badges;
- the opportunity for Scouts to make presentations to her class on cycle charts/coloring posters, how to make batteries, a trip to a geothermal plant, and a trip to the Berkeley Botanical Gardens;
- Scout/student participation in environmental education games; and
- utilizing Scout aides in a class presentation of Save-Your-Life Cooking.

During the first week, the emphasis was upon values. Materials used included Earth 20/20 theory, charts, graphs, and such activities as making a collage illustrating how advertisements encourage high energy consumption and viewing a film in the Churchill series, entitled Actually You Can Live Better.

The second week focused on using booklets and a filmstrip from the National Geographic Series, and discussing electric, coal, oil, hydroelectric, nuclear, solar and geothermal power.

During the third week, a linkage activity with another nonformal education agency, the Audubon Society, was conducted. The class began preparation for a field trip to an Audubon wildlife sanctuary, Richardson Bay. The teacher utilized student/teacher handbooks as suggested by Audubon. She also invited Scouts in the ACCAP program to visit her class and discuss the trips to further prepare her students.

The fourth week included further preparation for the field trip, the field trip itself and follow-up activities.

The last two weeks, the class concentrated on a variety of energy activities including an energy source chart and research project, energy alternative activity, an energy knowledge test discussion, an alternative life style design activity, the film Less is More from the Churchill series; Earth 20/20; and an exam on energy. One Scout was invited to speak on whales and whale migration. Energy and land use activities continued throughout the semester.

The final Design Committee meeting was held after the pilot project was completed. The purpose of the meeting was:

- to report on the pilot programs and verify activities;
- to evaluate the pilot programs;
- to gather recommendations, based on individual experiences, for revisions of the model and for changes in program level procedures;
- to generate plans and procedures for continuing implementation of linkage.

C. EVALUATION

The evaluation of a linkage project can be viewed on four levels: learner, instructional, institutional and societal. While the scope of this six-week project precludes a meaningful evaluation on the societal level, evaluation on the learner, instructional and institutional levels was possible. Within this context, evaluation was both formative and summative. Since the purpose of this evaluation was to examine processes as well as products, a need was recognized in the overall evaluation plan for evaluation of both design and impact and instruments were developed addressing these needs.

During the design phase, Design Committee members were asked to provide Far West Laboratory with feedback in two major ways. First a questionnaire entitled: "Critique of the Design Committee Process" was distributed to all members. This questionnaire required respondents to consider the usefulness,

deficiencies and strengths of the process used in formulating the design of a linkage model and program. Second, the Design Committee meetings themselves were a forum where opinions, attitudes, experiences and ideas were shared and discussed. Committee members understood that they were to play their roles in a self-conscious manner: that is, members were encouraged to verbally examine and criticize their own roles as participants in the committee.

Additional feedback on the Design Committee process was provided by a Far West Laboratory observer/participant, who attended all meetings and documente and suggested direction for the precedings.

Other evaluation strategies employed during the design phase of program development included additional questionnaires and group discussions. A form entitled "Questionnaire for Design Committee During Development of School/Scout Linkage Program" was distributed to all members. This questionnaire asked respon dents to report and discuss already-existing school/Scout linkage arrangements and desirable improvements, to rate the extent to which various possible types and degrees of linkage were desired, to list perceived benefits and costs, and to discuss the perceived feasibility of various linkages.

Near the completion of the Committee's program design work, group discussio and a questionnaire aimed at administrators focused attention on anticipated cost-effectiveness, problems and feasibility of programs and the extent to which resources and components of school and Scout programs were expected to be utilize

Implementation of the pilot program and impact evaluation reporting began simultaneously. Teacher/counselor participants were asked to maintain careful records of linkage program activity. Their activities were documented in several ways, although those teachers/counselors who were involved in the ACCAP program were asked to report in a more limited fashion, because of the more structured, uniform nature of that program.

The environmental education program teachers were asked, first, to keep a daily log or diary to document the program on a day-by-day basis. This log was to include:

- the extent to which activities or resources of the other organization (school or Scouts) were used in the program;
- the user's general satisfaction with these activities or resources and their fit with the regular school/Scout program;
- the reactions of students/Scouts to the day's activities;
- problems that arose in the day's activities;
- the degree to which students/Scouts seemed to be attaining the desired outcomes (attitudes, knowledge, skills) of the program;
- unanticipated effects of the day's activities;
- suggestions for improving the activities; or,
- suggestions for improving the method or type of linkage arrangements with the other organization.

All teachers and counselors were also asked to maintain a record of specific linkage activities they performed and to include the date performed, time spent, and any or all of the following:

- What was done?
- What was accomplished?
- What was the importance to linkage?
- Was there a better alternative?

At an ACCAP orientation meeting, Design Committee representatives presented the Environmental Careers program to interested Scouts and their parents. At the end of the meeting, questionnaires were distributed to Scouts and parents to determine their reactions to the presentation. These questionnaires elicited information regarding attitudes toward the program, previous learning experiences and current awareness of environmental and career education.

In order to monitor the environmental education and environmental caree.s

programs, the linkage project coordinator interviewed teachers, counselors and administrators in the field during the pilot-test phase. The purpose of these interviews was threefold. First, the interview was structured to provide a working description of individual programs. Second, it provided information concerning participants' attitudes toward the organizations involved. Third, the questions served a trouble-shooting function.

The last ACCAP activity was a presentation on careers in regional parks given by a Park Manager and coordinated for the schools by the Scout Council Executive. In conjunction with that event, a Career Seminar Packet was developed by Far West Laboratory and tested by the Scout Council Executive. The packet gave guidelines for presenting an outside speaker. An evaluation form, asking for comments on the quality and utility of the packet, was then distributed to the user and to others involved.

Finally, at the last Design Committee meeting held after the pilot program had come to a close, an "Evaluation of the Pilot Program" form was distributed to Design Committee members. This instrument was designed to elicit attitudes toward the linkage program, improvements in linkage and curricula, costs/benefits of linkage, degree of attainment of linkage desired, changes in perceptions of the organizations involved, degree of receptivity to change, desire to continue/expand linkage, and the usefulness of procedural guides.

The significance of the pilot test to the overall progress of linkage is necessarily limited in scope. As stated earlier, a six-week pilot test of this sort cannot hope to affect linkage significantly on all levels: societal, institutional, instructional and learner. Time, then, was a severe limitation. Another problem was that the program involved whole school and Scout districts. Yet neither principals nor Scout unit leaders were sources for either development or evaluation activities. This situation may be unique to the pilot test;

at any rate, project staff agreed that, in future linkage efforts, more attention should be given to involving strategic people.

A frequently discussed topic at Design Committee meetings was the importance of motivation for linkage. In the case of the pilot test, impetus for linkage did not originate within either of the linking organizations. Instead, it was imposed by the project upon the organizations. Design Committee members and program leaders stated that, because of this, linkage aspects of their programs were sometimes forced. An actual interorganizational linkage would not have this problem, since the decision to link would be an internal one.

Finally, the part played by Far West Laboratory was not that of a disinterested third party. Far West Laboratory performed tasks and provided services and financial support that were external to the role of facilitator.

D. FINDINGS, ANALYSIS AND INTERPRETATION

This section is divided into Design and Impact Phases.

1. Design Phase

Findings, analysis and interpretation of the Design Phase are based upon responses to three instruments: a) Critique of the Design Committee Process, b) Questionnaire for Design Committee During Development of School/Scout Linkage Program, and c) Questions for Administrators.

a) Response to: Critique of the Design Committee Process.

Representatives of Scouting/USA and the Alameda Unified School District has some diffuculty working within the Design Committee context. While Design Committee members protested against meetings emphasizing discussion of the linkage model, they also complained of "not enough direction on goals of the project." This contradictory message suggests that although Far West Laboratory presented enough material, it nevertheless was not fully successful in communicating the relevant information to Design Committee Members. The

participants were largely uncomfortable working in a relatively open-ended situation. Some would have preferred to be told what was required, rather than to face the number of options that Far West Laboratory offered.

There was also criticism of the meetings themselves. First, it was stated that they should have been spaced farther apart. Second, they should have been more informal. Third, Scout unit leaders should have taken an active role early in the project development phase. Fourth, several teachers suggested that the money spent on lunches could perhaps have been better used to buy either substitute time for curriculum development, transportation for field trips, or additional classroom materials. Criticism of both the method of selection of Design Committee members and the lack of formal provision for administrative approval/participation at the individual schools was also voiced.

Finally, several Design Committee members were uncomfortable about being asked to carry on design and evaluation activities. Some expressed their belief that it was Far West Laboratory's responsibility to design the linkage programs and evaluate the design committee process, presumably without any requested input.

The most helpful aspects of the Design Committee process included exchanging ideas and information, meeting at one another's places of business and becoming more familiar with one another's interests and perspectives. When asked whether or not the Design Committee process was helpful and whether or not it would be helpful to others, the majority responded that it was and would be very helpful/useful.

b) Response to: Questionnaire for Design Committee During Development of School/Scout Linkage Program

A majority of Design Committee members indicated no previous experience with linkage. Once introduced to the idea, however, most agreed it would be either "desirable" or "very desirable" to establish institutional linkage arrangements. Specific linkage arrangements that participants said would be most beneficial included linkages between school personnel themselves, between school and Scout personnel, and between schools and other community agencies. It was hoped linkage would foster such activities as cross tutoring, exchange of information/material, mutual recognition, and joint projects. Committee members also mentioned some factors that inhibit the desirability of linkage, including costs in terms of time (working beyond normal business hours) and money. Also, it was stated that those not interested in contributing to the linkage effort (and therefore not reaping the benefits) might resent those that do. The Design Committee members indicated that other problems that should be considered during the design and implementation of linkage were: scheduling, (initial) loss of efficiency and the need, in many cases, for major attitudinal changes.

As previously stated, Design Committee members recorded more statements in favor of linkage than against it. The major reasons expressed for trying to establish and/or expand school/Scout linkages were:

- to reduce fragmentation and increase student's sense of belonging;
- to utilize previously untapped resources;
- to effect greater learning and peer group socialization;
- to create wider interest and respect for Scouting;
- to improve the quality of school and Scout programs;

- to minimize duplication of human and physical resources, thereby raising quality while lowering cost; and to create more learning options for students.

c) Response to: Questions for Administrators

During the design phase, administrator members of the Design Committee held the opinion that the program(s) being planned would adequately cover the kind and extent of school/Scout linkages each felt to be most important. However, they expressed the wish that teachers and students receive more direct encouragement to participate in Scouting and suggested that more community agency options should be made available.

The administrators were split on the question of whether or not full use of existing resources was accomplished in the program design. Suggestions for increasing efficiency included Scout/student participation in model planning and utilization of local Navy Base resources and County Office film library resources. The "need for a local project manager to assist participants in planning activities and also to monitor the degree of achievement of each activity" was also stated.

Administrators agreed that the program(s) will probably be carried out "completely as specified" or "almost completely as specified" in the program design. However, they anticipated that those implementing the program(s) might face problems in communicating the objectives of the program(s) to non-Design Committee participants and in arranging transportation and release-time for school personnel as well as in scheduling field trips and activities. Suggestions for strategies that might effectively deal with these difficulties included publishing and sharing plans with all interested parties (especially school principals not involved in initial planning) and careful planning and coordination among schools, Scouts, troop leaders and parents.

Recommendations for institutional arrangements that might alleviate these problems included

- the more careful timing of implementation, and
- establishment of criteria for the selection of participants prior to implementation.

One suggestion for improving the cost-effectiveness of the program(s) was to explore alternatives to proposed field trips ("What exists locally that might achieve the same objective?"). A second suggestion involved establishing the position of on-site coordinator at each agency office since it was pointed out that it was unrealistic to assume that project staff from Far West Laboratory would be available to coordinate and execute linkage-related tasks.

2. Impact Phase

Findings, analysis and interpretation of the Impact Phase of the project are based upon responses to four categories of instruments: a) the ACCAP Questionnaires for Scouts, Parents, and Teachers; b) the Calendar, Daily Log and Linkage Activities Record; c) the Career Seminar Packet Evaluation; and d) the Design Committee Evaluation of Pilot Program.

a) ACCAP Questionnaires for Scouts, Parents, and Teachers

Response to the parent and Scout questionnaires distributed at the ACCAP orientation meeting was positive, warm and enthusiastic. There was some criticism (e.g. "Talk louder" and "Let some Scouts do speeches and stuff" and "Get the word to Scout masters and boys as soon as possible."), but the majority reported the meeting as having been well-run and informative.

Students were somewhat more cautious than parents, but again most people (14 out of 27 and 18 out of 27 for Scouts and 18 out of 29 and 21 out of 29 for parents, respectively) said that they thought participation in the project was "very important" and that participating Scouts would enjoy the events "very much."

Everyone who returned questionnaires decided to participate in the project. Twenty-four parents out of 29 and 24 Scouts out of 27 said that the idea of schools and agencies such as Scouts working together on such special projects as this one was a "very good idea."

Questionnaires were again distributed at the conclusion of the ACCAP experience. This time, Scouts, parents and one classroom teacher of each Scout were asked to respond.

Of 28 participating Scouts, 24 responded. The majority stated they had learned from and enjoyed each of the ACCAP events. In fact, 20 Scouts reported that they thought the program was either fairly or very important to them personally. Four stated the program was of average importance, and none stated it was either not very important or not important at all.

Fifteen Scouts said they enjoyed the ACCAP activities "very much," 5 enjoyed them "quite a bit," and 4 said they were "O.K." Asked whether "the schools and Scouts should continue to work together on projects such as this one," 17 replied: "It's a very good idea;" 5 said the idea was fair; and 2 said the idea was average. Again, no one stated the idea was either not very good or very poor.

In addition, Scouts were asked if they applied what they learned in ACCAP to Scouting activities. Ten Scouts replied they had not while 8 said they already had, and 3 said they intended to. Three of the 24 did not answer the question. Asked if they had used information learned at ACCAP activities in schoolwork, twelve replied that they had not; six said they had, two said they intended to, and four did not answer the question.

Additional comments included suggestions for further ACCAP activities. Some thought "it would be more helpful to work on only one Merit Badge rather than parts of three." Other comments included such statements as: "We should continue it;" "It was fun and I learned a lot;" and "I would like to be in another one."

Seven parents returned post-ACCAP questionnaires to Far West Laboratory. Of these people, some had more than one child participating in the program. Asked to comment upon "What did you (or your son) think of the event? What do you think he learned? What problems, if any did you or he have? What did he seem to especially like? What else should we know about his reaction to the event?" Four respondents were able to list specific items their children had learned (or learned about); one parent did not respond; and the other two responses were generally favorable, but not specific.

Two parents stated that they considered the program "very important" for their sons; four said it was "fairly important"; and one said it was of "average importance." Four parents stated that their sons enjoyed the events "very much;" two said "quite a bit;" and one said it was "O.K." Asked whether schools and Scouts "should continue to work together on special projects such as this one," five said it was "a very good idea" and two said "it's a fairly good idea." Generally, parents were pleased with the program. One parent, however, voiced concern that students "might miss too much school." Another parent suggested that Merit Badge requirements be completed by the boys as a group.

Finally, participating students were asked to give an ACCAP "Teacher Questionnaire" to one of their teachers. Six of these questionnaires were returned by teachers to Far West Laboratory. One

teacher voiced reservations concerning the effect of the program on attitudes toward school. Others stated that missed schoolwork was not made up. Two of the six teachers were unaware of the program until they received the questionnaire, and none of the teachers reported a carry-over of what students learned on ACCAP outings into the classroom.

b) Calendar, Daily Log and Linkage Activities Record

Not all Design Committee members maintained a Calendar, Daily Log, or Linkage Activities Record. These items functioned mainly to keep Far West Laboratory abreast of what the individual environmental education programs involved. The program descriptions derived from these documents are contained elsewhere in this report.

c) Evaluation: Career Seminar Resource Packet

The "Career Seminar Resource Packet" itself was compiled from several Scouting/USA sources. It was intended to serve as a guide for a Scout Executive to conduct a Career Seminar, which is an event or series of events featuring career speakers for high school students. The prototype resource packet was distributed to and comments were solicited from six people: two Scout representatives, two school counselors, one school administrator and one paraprofessional in charge of a high school career center. The two Scout representatives, the Alameda Council Executive and the liaison worker, used the packet as a guide in setting up and running a seminar.

Response to the packet was generally favorable. Although half the respondents said that they had no previous experience or knowledge of Career Seminars, all said that reading the packet gave them a clear notion of what a Career Seminar is. All agreed that the packet would be a useful tool in organizing a seminar. Of the two Scout representatives who used the packet, one rated all the information useful and the other rated most of the information useful. All respondents were asked which aspects of the packet were most

useful. Responses included:

- Entire packet;
- Appendix A (Package for Resource People);
- Appendix C (Feedback); and
- the section outlining the four activity phases of ground-work, before, during and follow-up activities.

The Scout representatives who implemented the Career Seminar had two specific recommendations for additions to the packet. First, they suggested that the packet should state a need for resource, school and Scout people to meet and plan the details of the Career Seminar together. The second suggestion was that seminar leaders should be advised to consider the size, as well as the age, of the audience.

Although the Career Seminar Resource Packet was originally conceived as a Scout Executive's aid, those who evaluated it agreed that it would be useful to school personnel or to other organizations interested in working with schools.

It was generally agreed that producing a Career Seminar was a complicated process. It involved preparation and follow up activities as well as requiring a representative of three separate organizations to join in an effort, the results of which might not be immediately evident. Nevertheless, response to the Career Seminar idea, as well as to the Career Seminar Resource Packet, was enthusiastic.

d) Design Committee Evaluation of Pilot Program

The Design Committee provided summative evaluation of the pilot project at the last Design Committee meeting, where an instrument entitled: "Evaluation of the Pilot Program" was distributed. Among other things, this instrument was designed to elicit attitudes toward the linkage program and suggestions for improvements in linkage and curricula; to determine the costs/benefits of linkage and ascertain

the usefulness of procedural guides. Thirteen Design Committee members were asked to respond to this questionnaire. Four replied that their basic attitude toward a linkage program had not changed over the course of the year. On the other hand, nine people reported a greater appreciation of the application and value of linkage arrangements.

Responding to a question concerning improvements related to the pilot program, six people said that the curriculum had improved because of the school/Scout linkage program. Other respondents cited increased understanding, cooperation and/or communication between the Scout and school staffs regarding their educational goals and objectives. Material sharing procedures and development of activities designed to serve common objectives also benefited from the program.

Asked to respond to the question, "What have been the major costs of this pilot linkage program?," six people said that money for classroom substitutes during the Design Committee meetings was probably the major cost. Other monetary costs mentioned included additional time/responsibility for staff, and money for purchase of such materials as the Merit Badge pamphlets. One psychological cost was the feeling of failure on the part of some participants who judged their linkage arrangements to be less than had been hoped would develop.

The list of major benefits included the following categories:

- increased awareness of one's own and other agencies as resources;
- increased awareness of the outside world in the classroom;
- increased student interest in school and Scout programs;
- opportunities for sharing and leadership experiences for all participants;
- the introduction of new materials/curricula; and

- the refocusing and integration of an individual's formal and non-formal education.

Design Committee members were also asked whether or not the hoped-for degree of linkage had been achieved. Two respondents said that the degree of linkage attained coincided with their expectations for the project. Two others stated that the degree of linkage attained somewhat, but not entirely, met their expectations Of the five respondents registering disappointment in the degree of linkage attained, three said that their major disappointment stemmed from a lack of involvement and participation on the part of Scout unit leaders.

Asked what changes in perception of both their own and other organizations occurred, six respondents registered confirmation of or no change in perceptions. Others reported increased awareness and appreciation of either Scouting or of the possibilities and difficulties involved in establishing linkage arrangements.

Only one of the Design Committee members said that continuation of linkage was undesirable ("not enough time is given to learning . . . reading, writing and math"). All other respondents not only wanted linkage to continue, but also offered suggestions for expansion. The most common suggestion was to increase the number of participants and participating agencies. Other suggestions included:

- creation of an Advisory Committee composed of representatives of organizations that are potential community linkages;
- expansion to other career clusters;
- provision for early long-range planning; and
- expansion of linkage to include those schools/Scout units that are willing to work together.

Finally, Design Committee members were asked if procedural guides could have been helpful to them, and what kinds of information such guides might contain. Six respondents said they were satisfied with the direction and guidelines offered in the project. One felt that procedural guides would have been an inhibiting influence. One respondent said that procedural guides "would help but . . . inservice training of participants would be better." Five respondents felt that procedural guides could function to introduce and involve participants in the linkage process. Specific suggestions for guide subjects included:

- how to establish linkage;
- what to expect from linkage;
- how to call a meeting for all leaders and interested teachers in a school;
- how to organize and run an intra-organizational meeting to determine if linkage is desirable and feasible;
- how to organize and run an inter-organizational meeting to establish mutual interest in linkage; and
- how to disseminate information on participating organizations and on linkage itself.

E. RECOMMENDATIONS

An interpretation of research findings and an assessment of the pilot program outcomes and model design has led to a set of recommendations for continued research, design, and development in the area of interorganizational linkage between the formal and nonformal educational sectors.

These recommendations fall into five general categories:

1. Field Testing of the Model and Implementation Guidelines.
2. Design and Development of a Training Program for Boundary Personnel.

3. Design and Development of a Plan for the Dissemination of Linkage and Coordination Models

4. Design and Development of a Plan for the Integration of Linkage Programs into the Educational System

5. Development of the Program Content Area

1. Field Testing of the Model and Implementation Guidelines

The linkage model and implementation guidelines should be viewed as products of an initial research project. The model and guidelines reflect the information contained in the knowledge base and have been revised based on the pilot test data. To continue a research effort in educational linkage, an extensive field test of the model and guidelines is needed.

The resulting adaptation of the model should be applicable to a variety of settings in communities across the nation. To accomplish the field test goal, it would be necessary to achieve several objectives. Further research and analysis should be conducted to expand the existing knowledge base, which could then be used to adapt the linkage and coordination model designed in the current project. Sub-objectives would include: (a) updating and analyzing research findings concerning interagency linkage and interorganizational coordination, (b) collecting and organizing information about the goals, programs, and characteristics of the content area (environmental education) of participating educational agencies and (c) determining the compatibility of participating agencies in matters concerning the content area.

It would then be necessary to design variations of the linkage coordination model so that alternative linkage and coordination configurations could be considered, and the most promising ones selected for adaptation within the context of the participating organizations.

The third step would be to develop or acquire means and methods by which to activate the program and to implement linkage and coordination. Once these resources for program implementation had been acquired, methods and procedures for their use would have to be described. At that point, the field test program could be constructed, including plans for the introduction of the program at several sites across the nation, and for its evaluation.

It is recommended that the field test linkage/coordination models be introduced into the setting of the participating organizations for a minimum period of four to five months. The program would be described and documented, and the model revised accordingly. At that point, a judgment would be made about whether or not further testing would be required before dissemination of the model would be considered.

The adaptation of the generic linkage model would involve the following operations:

- Define institutional goals, programs, and organizational characteristics of the agencies participating in the linkage.
- Determine goal, program, organizational overlap and compatibility.
- Consider alternative linkage/integration configurations, and select most promising configuration(s).
- Design linkage coordination model as the adaptation of the generic model.
- Develop implementation plan and make arrangements for implementation.
- Implement, test, and assess program impact and make adjustments.
- Report findings.

2. Design and Development of a Training Program for Boundary Personnel

The analysis and interpretation of the pilot test findings indicate that planning, implementating, and evaluating linkage efforts requires boundary personnel who are trained in linkage procedures. The design and development

of a training program to meet this need, should be accomplished prior to the field testing of the model so that the training program could be pilot-tested concurrently.

The training program for linkage system personnel should facilitate the development of their competence in linking and coordinating educational programs between the formal and nonformal sectors. The steps necessary to the accomplishment of this training program are similar to the ones described above for adaptation of the model; however, here each step would necessarily require more time and depth since an initial research project has not been conducted.

- Research and analysis should be conducted in order to establish a knowledge base relevant to the design of the program.
- Alternative designs for the program should be developed, the most promising selected, and a training guide prepared.
- Specific training materials should be developed, along with plans for testing them and plans and arrangements for introducing the program.
- The training program should be implemented and evaluated and the findings documented and reported.

The resulting training program for linkage personnel would then be ready for field-testing on a national basis. It should be emphasized that the training program focus would be on the experiential rather than the study mode. Since linkage requires real skills, the training program would focus on problem exposure within the functional context of linking organizations. Both pre- and in-service programs should be considered valuable.

The following section presents a characterization of the linkage training program and a general definition of the training program.

a) A Characterization of the Linkage Training Program

The characterization of linkage training is developed here in two parts. First, a linkage training program is described and, second, the training program that would implement the training required is described.

General Training Requirements for Linkage Personnel

A most important quality of a systematically-designed and developed linkage is that it be self-generating and adaptive, independent of any initial facilitator or decision-maker. This independent adaptive quality requires linkage personnel competency and a knowledge domain beyond that which is prevalent among most organization managers.

Required competencies and knowledge domains were identified from the literature on interorganizational linkage in the process of developing specifications for a generic linkage model. It was concluded that linkage personnel, including those indirectly related to linkage, need to know linkage goals, strategies for attaining those goals, and practical techniques for carrying out the strategies. Moreover, linkage personnel must know decision-making and problem-solving techniques that will keep the linkage adaptive and fruitful. To fulfill the demands made on linkage personnel and, in particular, on linkage coordinators, a well-developed linkage training system is necessary.

The skills and information categories that would constitute a coordinator-role definition and would be operationally developed as training components of a training system are blocked out here on a general level.

Conflict and Problem Solving

The coordinator's role includes having an awareness of the value, as well as the danger, of conflict and knowing skills to handle conflict when necessary. A coordinator must have the knowledge and skill to foresee problems and to bring to bear all the resources of the linked organizations to solve or channel problems.

Negotiation and Transformation Skills

To be most creative, the linkage arrangement must be open to every internal and external potentiality. Even after the initial negotiation is completed, new situations demanding new negotiations will arise. Negotiation competencies are, therefore, necessary to a coordinator. An organic part of negotiation is transformation. Values, goals and structures are going to be questioned, examined, and re-oriented by the linkage arrangement and by the linkage coordinator. Competencies that enable the coordinator to meet this demand are necessary.

Systems Theory and Practice

Many of the qualities of linkage arrangement are derived from the qualities of systems in general. Thus, the coordinator needs the analytical and synthetical skills that are inherent in the systems approach to unify separate or fragmented organizational efforts.

Evaluation

The coordinator's responsibilities include objectively judging the effectiveness and desirability of the linkage. The coordinator must know when and how to alter direction, when to decide on a different strategy or different goal, and how to integrate such decisions into the linkage.

b) An Initial Definition of the Training Program

The training program would consist of three subsystems: the learner system, the resource system, and the application system.

The learner system includes linkage coordinators, linkage personnel (teachers, administrators, managers, coordinators, students), and other staff involved in the linkage process.

The resource system provides the trainees with validated training models, resources and procedures relevent to carrying out the program.

The resources and procedures will have the following characteristics:

- They will satisfy the most appropriate requirements of training needs determined from an extensive review of the literature conducted early in the research effort and from direct experience during the field test of linkage coordination practices.
- They will be sequenced in terms of difficulty, thus accommodating the various entry level competences of linkage personnel.
- They will be of sufficient adaptability to accommodate the varied requirements of specific linkage requirements.

The application system consists of a variety of settings in which linkage planning, designing, developing, implementing and evaluating will be conducted.

An extensive review of the literature on linkage has shown that the training program content should:

- be based on an analysis and definition of tasks required by linkage personnel as well as research on interorganizational linkage;
- consider initial trainee competence and previous linkage experience;
- develop competences that will enable the coordinators and linkage personnel to implement and coordinate programs of the formal and nonformal sectors;
- provide for simulation experience in which the facilitator can plan, design, implement and evaluate the effects of ongoing linkage arrangements; and,
- provide learning activities for the teacher and counselor assessment of student learning outcomes.

3. Design and Development of a Plan for the Dissemination of Linkage and Coordination Models.

A common, difficult problem for research and development efforts is to effect dissemination of the products. In the area of interorganizational linkage the problem is complicated by the requirement that the organizations be highly motivated to accomplish linkage before they will be interested in linkage-related products. The question then becomes how to reach those interested organizations

with the linkage model, procedural guides and training programs for linkage personnel.

An effort should be made to address this question and to provide a dissemination plan on a national basis. Products that would become a part of this dissemination effort would include: (a) a description of model(s); (b) a description of research, development and implementation activities; (c) linkage-related evaluation manuals; (d) reports on field-test findings; (e) procedural guides to accompany linkage models; (f) a description of training program(s); (g) procedural guides to accompany the training program(s); and (h) updated literature reviews, probably in the form of annotated bibliographies or sourcebooks for use by educational practitioners.

Dissemination possibilities include the following:

- distribution of a newsletter reporting activities, results and participants in field-test programs;
- distribution of quarterly progress reports to local review committees and consultants;
- dissemination of a project brochure to content-related (environmental education) personnel in formal and nonformal sectors.
- dissemination of information on available linkage/coordination materials;
- dissemination of a filmstrip documenting the process of linkage;
- reporting of project findings in appropriate professional periodicals, at national educational conferences, and at annual meetings of participating national operations.

Future efforts might also consider the possibility of sending trained facilitators to organizations wishing to link and/or sending leaders for linkage workshops. This is perhaps the most effective method for dissemination of the findings.

The above alternatives whould each be given careful consideration, and any or all of them should be included in a comprehensive dissemination plan.

4. Design and Development of a Plan for the Integration of Linkage Programs Into the Educational System

A special effort should be made to expand the thinking of educators to include the concept of linking the formal and nonformal education sectors in their basic attitude toward education. Presently, educators have various attitudes toward linkage, with the most positive attitudes likely to be found in career and vocational education programs. The use of the linkage model and development of a linkage personnel training program, would contribute to the breakdown of existing barriers.

An effort to lay the groundwork for linkage seems necessary. Results of the current project indicated that the motivation of organizations and personnel to accomplish linkage was a key to the perceived success of the linkage effort. Efforts to address the problem of the inherent resistance on the part of any organization toward linkage should be explored. Findings in this area reported in the knowledge base of the current project would be useful, and other ways of contributing to new attitudes should be explored.

5. Development of the Program Content Area

Project data seemed to indicate that linkage potential is enhanced if the relevant program content area(s) of the agencies are already strong and effective. Otherwise, the linkage effort tends to be sidetracted by the need to strengthen the content. The result may be to create add-on programs that require a great deal of staff time and energy and serve to detract from and perhaps even weaken the linkage effort.

It was not clear, however, what level of program development is needed in order for linkage to be effectively accomplished. Further research should be conducted in this area.

It should also be recommended that research and development efforts be made in those content areas in which linkage is desired, but in which current programs are not highly developed. For example, if linking the formal and nonformal educational sectors in programs of energy education is a goal, attention directed first to the enhancement of existing energy education programs and the development of new energy education programs in both the formal and nonformal educational sectors would probably be productive. The effort to strengthen program content can be considered a pre-linkage requirement and can contribute to the later success of a linkage program.

BIBLIOGRAPHY

Aiken, M., & Hage, J. Organizational interdependence and intra-organizational structure. American Sociological Review, 1968, 33, pp. 912-930.

Aldrich, Howard. The environment as a network of organizations: Theoretical and methodological implications. Paper presented at the Research Committee on Organizations section of the International Sociological Association meetings, Toronto, Canada, August, 1974.

Beal, G. M. Interorganizational coordination. Department of Sociology, Iowa State University, Ames, Iowa. Paper presented at a conference on Agriculture in a Quality Environment, Cedar Rapids, Iowa, 1972.

Boyce, V. M. Utilization of voluntary leaders. 4-H Youth Development Extension Service, U. S. Department of Agriculture, 1972.

Dillman, D. A. Systematic linkages between voluntary associations: A theoretical model. Ames, Iowa: Iowa State University, 1966.

Finley, J. R., & Capener, H. R. Interorganizational relations: Concepts and methodological considerations. Paper presented at the Annual Meeting of the Rural Sociological Society, San Francisco, 1967.

Halpert, B. P. Interorganizational relationships: An interactionist approach. Paper presented at the American Sociological Association meetings, San Francisco, August, 1975.

Katz, D., & Kahn, R. L. Organizations and the system concept. In Brinkerhoff, M. & Kunz, P., Complex organizations and their environments, 1972, pp. 33-47.

Klonglan, G. E., & Mulford, C. L. Emphasizing interorganizational cooperation for social action. Perspective on aging, 1974, 3, pp. 6-9.

Klonglan, G. E., Mulford, C. L., Warren, R. D., & Winkelpleck, J. M. Creating interorganizational coordination: Project report (Sociology Report No. 122A). Ames, Iowa: Iowa State University, 1975.

Klonglan, G. E., Paulson, S. K., & Rogers, D. L. Measurement of interorganizational relations: A deterministic model. Paper presented at the American Sociological Association meetings, New Orleans, 1972.

Rogers, D. L., & Vacin, G. L. A deterministic model of interorganizational relations: An application to the community development process. Ames, Iowa: Iowa State University, 1972.

Warren, R. L., Burgunder, A., Newton, J. W., & Rose, S. M. The interaction of community decision organizations -- some conceptual considerations and empirical findings. Waltham, Mass.: Brandeis University, no date.

Young, R. C., & Larson, O. F. The contribution of voluntary organizations to community structure. American Journal of Sociology, 1965, 71, pp. 178-186.

Zimmerman, J. F. The cooperative approach to environmental enhancement. Final report on the National Conference on Managing the Environment, 1973.

PART TWO

A GUIDE TO INTERORGANIZATIONAL LINKAGE IN EDUCATION

Section I: A Generic Model

A. Key Linkage Concepts

B. Steps in the Linkage Process

Section II: Implementation Guidelines*

A. Pre-Linkage Activity

B. Linkage Activity

C. Formalized Cooperative Arrangements

*These guidelines focus on an Environmental Education program content area, but can be adapted for use with any content area.

A Guide to Interorganizational Linkage in Education

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INTRODUCTION

This guide* presents instructions for facilitating the planning, implementation and evaluation of a linkage program. Although the guidelines included here are primarily intended for use by a representative of an agency in the formal education sector (e.g., a public school administrator), they also have the potential for general market place use and thus may be utilized by a representative of the non-formal education sector (e.g. a Scouting Executive). Section I presents definitions of key linkage concepts and a generic model for the linkage process. The generic model details a process that has potential applicability in the creation of cooperative, coordinated arrangements (linkages) among formal and nonformal educational agencies. The purpose of these linkages is an increased instructional/learning resource capacity that can respond to the needs of the learner in the most effective and efficient way.

Section II presents procedural guidelines for applying the model to accomplish the linkage process. These guidelines focus on an Environmental Education program content area, but can be adapted by individual agencies to meet the demands of their specific linkage arrangements.

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The guide is published separately and is also presented as Section Two in the project Final Report: Linking Formal and Nonformal Education Sectors for the Advancement of Environmental Education. San Francisco, CA.: FWL, 1977. For project details, see Sections I and III of that report.

SECTION I

A GENERIC MODEL

A. KEY LINKAGE CONCEPTS

1. Definition of Linkage

An initial definition of linkage consists of the following: A linkage is an arrangement between organizations whose internal components allow for a mutual coordination and/or exchange of resources and activities. The express purpose of this arrangement is to achieve the goals and objectives of each participating organization.

This is a general definition. Many of the activities that schools have been engaging in for years would fit within this definition. For instance, a local business providing speakers for a classroom career day would be a linkage activity.

From the standpoint of a linkage arrangement to expand education, the difficulty with these types of activity lies in their looseness. They are usually carried out on an informal, ad hoc basis and are not usually executed in a way that anticipates the future needs of learners. They may also lack institutional commitment. More importantly, they do not as a rule serve the purpose of creating a structional relationship among agencies that increases their potential to respond to the needs of the people they serve.

Thus, we suggest a tighter definition of linkage.

A linkage is a negotiated, authoritative arrangement between organizations (in the case of this general model, between formal educational agencies and another agency or agencies in an expanded educational space) whose internal components allow for a mutual coordination and/or exchange of resources or activities. The expressed purpose is to achieve not only each organization's goals and objectives, but also to achieve the mutually-defined goals and ob-

jectives that arise from the linkage process and are identified and defined by it.

This definition implies that linkage is a conscious process requiring participating organizations to formally sanction the explicit details of goals and objectives. It should be pointed out that while the linkage activity must satisfy some portion of each organization's needs or goals, these goals or needs do not have to be identical. From the standpoint of the formal educational system, linkage activities can satisfy educational or instructional goals. On the other hand, from the standpoint of the other participating organization(s), linkage activities can satisy a wide variety of goals including those that are education, public service, or personnel-oriented.

For instance, a linkage arrangement between a school district's environmental education program and the conservation program of the Boy Scouts of America may satisfy a different set of needs for each organization. The school program's use of Scouting resources may satisfy a need for obtaining an additional, relevant curriculum resource and the Scouting program may be satisfying its own need for reaching potential members or fulfilling a public service obligation to the community.

In addition to satisfying each organization's goals or needs, the linkage process also entails the explicit identification of goals and objectives (and the procedures and structures to meet these goals) for the linkage activity itself. Hence, in order to ensure that the linkage activity or arrangement is successful, conscious planning must occur that will result in an additional set of goals and objectives that will be unique to those engaged in the linkage process.

2. Role of Independent Linkage Agency

Up to this point, we have suggested that linkage occurs between two or more

independent organizations, with overtures being initiated by one organization and transmitted to another. There is, however, another alternative. Linkage could be facilitated by a third party -- an independent, relatively neutral organization. Although there is relatively little precedent for a third party facilitating the linking of organizations for educational purposes, this type of coordinating agency is relatively common in the health care and social welfare delivery systems. Benson (1974), in reviewing the literature for applied modes of coordination for welfare agencies, suggests that a third party can influence cooperative interorganizational coordination. Thus, much of the literature that may be useful to derive a model applicable to educational systems would be drawn from the health and social services fields.

3. Roles in Linkage Related Activity

Although linkage has been discussed as occurring between organizations or institutions, it must be understood that the actual coordination, planning, decision-making and implementation activities are carried out by people. These people represent the institutions and in this capacity commit the institutions to do more than they, as individuals, can do. When a third party enters the picture, another group of individuals is involved. Thus, we suggest that two distinct categories of individuals, each with differing roles, are involved in the linkage process:

(a) Boundary Personnel: These individuals represent the participating organizations and as such have the authority to go beyond each organization's limits or boundaries to perform communication and negotiation roles regarding the linkage process. A number of individuals may be included in the boundary personnel from each organization.

(b) Linkage Coordinator: One of the boundary personnel should be appointed to this position. It will be the responsibility of this

individual to coordinate the linkage process within the participating organization.

(c) Linkage Facilitator: The linkage facilitator represents the third party who may play a role in initiating and maintaining the linkage arrangement. The facilitator must thus possess the skills to analyze organizations, design linkage arrangements and provide the framework for implementation of these arrangements. The linkage facilitator may also provide training for boundary personnel, particularly the linkage coordinators, so that planned activities can be carried out effectively. (Note: The question of support and source of authority for linkage facilitators in the educational setting is an important issue that has not yet been fully explored.)

4. Costs and Benefits of Linkage

Although we are suggesting that the long-range benefit of linkage-related activities would be to expand the systems space of education, on a short-term basis there are a number of costs and benefits that each organization must consider in the linkage process. A list that was developed by Beal and Middleton (1975) follows. It has been adapted to illustrate possible costs and benefits from an educational agency's perspective. Since any one of these costs and benefits may provide powerful motivation for an organization to enter into or avoid linkage, they might best be dealt with by a third-party facilitator.

(a) Potential Benefits:

1. Maximize, make optimal use of or expand resources base. Resources may include money, physical facilities, equipment, supplies, publications, services, administrative staff, para-professionals, volunteers and available knowledge and skills.
2. Reduce overlap or duplication of programs or activities.
3. Enlarge scope of present programs.
4. Reach new and different groups of people.

5. Create more effective programs -- programs with more impact.

6. Coordinate and integrate each organization's input into a larger program with greater impact.

7. Eliminate mistrust, competition or conflict.

(b) Potential Costs:

1. Some organizational autonomy may be lost.

2. Requires time and energy to initiate and maintain linkage.

3. Creates potential for experiencing difficulty in determining benefits.

4. Creates confusion as to who should take credit for success or failure.

5. Exposes organizational weaknesses.

It should be noted that additional costs and/or benefits related more directly to the specific organization participating in linkage may be identified. The linkage facilitator must be able to analyze the possible costs and benefits, to inform the participants, and to suggest strategies to deal with those that present barriers to linkage activity. We have outlined the following steps from the perspective of the linkage facilitator. The steps, however, could presumable be adapted to a linkage process in which no facilitating agency or person is involved.

B. STEPS IN THE LINKAGE PROCESS

This section presents an image of a procedural model for the linkage process. The steps outlined in the model are derived from three sources. These include:

- The experiences of the Iowa State University Department of Sociology and Anthropology group as reported in Creating Organizational Coordination: Project Report (1975) by G. Klonglan, J. Winkelpleck, C. Mulford, and R. Warren.

- The professional development materials prepared by the East-West Communication Institute, Organizational Communication and Coordination in Family Planning (1975) by G. Beal and J. Middleton.

- The literature review and evaluation of the experiences carried out by Far West Laboratory staff for this project, and reported on in Final Report; Linking Formal and Nonformal Education Sectors for the Advancement of Environmental Education: Far West Laboratory, 1977.

In outlining the procedural model, particular care has been taken to include two categories of operations needed by a systemic, adaptive model. The first category is coherence: Are clear and useful sets of operations connected to each other by a logical and systemic tissue that constantly and purposefully directs these operations to a previously specified end? The second category is adaptability: Are operations sensitive to new data and new needs that enable the structure to adjust itself or regenerate without losing power or significance while difficulties are resolved or the ends achieved? The separate phases of creating a procedural model are outlined below in three procedural dimensions: A. Pre-linkage activity; B. Trial cycle of linkage activity; and, C. Formalized cooperative arrangements.

PRE-LINKAGE ACTIVITY

These tasks can be carried out by a facilitator meeting separately with organizations.

1. Define problem.
2. Specify set of organizations with potential to solve problem.
3. Meet with organizations to ascertain interest.
4. Determine which organizations will participate and obtain commitment of organizations to enter linkage negotiation.
5. Arrange for group meetings with boundary personnel.

TRIAL CYCLE OF LINKAGE ACTIVITY

These tasks can be carried out in group meetings with boundary personnel.

1. Outline linkage approach and roles (conduct any training needed).

2. Obtain domain consensus.

3. Outline general task environment of each organization, including:

   - goals,
   - resources,
   - functions/activities, and
   - structure.

4. Analyze specific task environment of each organization relative to linkage problem including:

   - goals/objectives,
   - resources,
   - functions/activities, and
   - structure.

5. Specify any constraints, limitations or unique situations that may affect the linkage process.

6. Based upon previous discussion, design one or more linkage configurations. (Note: This activity can be carried out by the facilitator, independent of the larger group.)

7. Select one or more linkage configurations for implementation.

8. Restate the goals/objectives for each implementation configuration.

(Note regarding points 9-12: The selected linkage configurations may require cooperation or specific activity from additional individuals within each organization. The linkage coordinator or other boundary personnel from that organization must ensure that cooperation, skills, resources and communication channels are present. Additional training may be required.)

9. Agree upon standards for the quality of the linkage program.

10. Specify and agree upon structures, roles, and responsibilities needed to attain goals and objectives.

11. Set up communication/feedback channels needed to implement linkage and monitor progress.

12. Set up evaluation parameters and procedures.

13. Try out linkage activity.

14. Provide evaluation feedback (formative and summative).

15. Adjust linkage configuration as required.

FORMALIZED COOPERATIVE ARRANGEMENTS

The initial trial cycle of the linkage activity, as well as adjustment of the activity based on evaluation information, should lead to a formalized coop-

erative arrangement between or among the participating agencies. As a final step, the linkage facilitator would theoretically withdraw as an integral part of this arrangement. The experience base from which we can draw conclusions about linkage facilitator disappearance from the system is extremely limited. In the health and social welfare fields, linkage activities usually continue under the umbrella of some form of coordinating agency. This may or may not be the case in the educational setting.

SECTION II

IMPLEMENTATION GUIDELINES

These guidelines give directions on how to carry out the linkage process presented in the generic model. The guidelines focus on an environmental education program content area, but can be adapted for use with any content area. To make the guidelines as useful as possible, they have been organized here into the same general categories that were used in the generic model: A. Pre-linkage activity; B. Trial cycle of linkage activity, and C. Formalized cooperative arrangements. Within those categories, the steps to be completed within each process (e.g. 1. Define problem, need or linkage area) are listed and instructions for each step are presented. In many cases, however, instructions contained in a particular step (e.g., Maintain good communication with boundary personnel) are applicable throughout the linkage effort and should not be considered isolated by the step-by-step process.

Since the main goal of a linkage program is to set up a negotiated authoritative relationship between two or more organizations who are interested in accomplishing mutually compatible goals, the instructions presented here should be particularly useful for a linkage coordinator, (a person within an organization who is responsible for monitoring, supporting and reporting upon linkage arrangements), or for a linkage facilitator, (a person outside an organization who is responsible for attempting to bring together two or more organizations for the purpose of linkage).

PRE-LINKAGE ACTIVITY

1. Define Program, Need or Linkage Area

The first step in devising a linkage program in environmental education (EE), is to look at the EE programs actually in operation in your own organization and in the organizations with whom you are considering linkage. It is

best if the two organizations seeking linkage have well-defined EE programs in operation before linkage is attempted. Otherwise, the linkage effort may be sidetracked by the need to strengthen the EE content of programs. The result may be attempts to add on programs that require a great deal of staff time and energy, and tend to detract from and weaken the linkage effort. Thus, the first priority for both formal and nonformal educational sectors may be to establish a minimal level at which existing EE programs should be functioning. This focus on strengthening existing programs, or developing new ones before any linkage arrangements are made, may contribute substantially to the success of the linkage program later.

One way to determine the nature and extent of your organization's EE program is to conduct a survey. In addition to describing the EE program, this survey might also identify needs and strengths that were not previously apparent. You can then pinpoint needs that an outside cooperating agency might address, as well as strengths that you can offer to the linkage plan.

A survey of formal education's EE programs might ask such questions as the following:

- Do we have an environmental education program clearly identified and implemented in our school district?
- What schools in the district have outstanding environmental education programs?
- Are there any special envionmental education programs not necessarily attached to a specific school?
- Does our district have in-service training programs for teachers or administrators in environmental education?
- Do we have an environmental education district-level coordinator, committee, or office?
- What cooperation with other organizations in environmental education did our district have during the past year? Specify organizations and briefly describe the cooperative effort.
- Does our district have an environmental education resource file?
- Does our county/state have any EE program guides?

If you or some member of your organization cannot give positive answers to a majority of the above questions, you may need to focus on defining and/or developing the organization's environmental education programs before working on linkage programs with other organizations.

In those organizations that already have strong EE programs, attempts at linkage with other organizations may result in the pinpointing of a need that is impossible or difficult for the organization to fill alone. An expanded list of possible benefits from establishing a linkage effort, as presented in the linkage model, are:

- To maximize, optimize use of, or expand the resource base. Resources may include money, physical facilities, equipment, supplies, curricular materials, services, administrative and instructional staff, paraprofessionals, volunteers and available knowledge and skills.
- To reduce overlap or duplication of programs or activities.
- To gain recognition for community-based agencies as educational organizations.
- To broaden community awareness of and involvement in each organization's program.
- To enlarge the scope of present programs; to enrich classroom activity through utilizing community resources.
- To reach new and different groups of students.
- To create more effective programs with greater impact on students.
- To coordinate and integrate each organization's input into a large program with greater impact.
- To enrich curriculum development.
- To enrich students' experience in areas of special interest to them.

Some of the costs, also as presented in the model, may be:

- Loss of some autonomy for the organizations involved.
- The expenditure of time and energy to initiate and maintain linkage.
- The creation of potential difficulties in determining benefits.

- The creation of confusion in determining who takes credit or responsibility for success or failure.
- The exposure of organizational weaknesses.

Related to the possible costs and benefits, you should consider certain other aspects of your organization's ability to create a linkage program. Such questions as the following should be asked.

- What will the attitude of school or organizational personnel be?
- Are personnel available--or can they be made available--to initiate efforts for linkage?
- Will the school board, executive council or any other analogous agencies be supportive?
- Is our environmental education program strong enough?
- Are there other organizations with environmental education programs strong enough?

One of the first things that can be clearly defined is who, in an organizational sense, should be involved in the linkage. A problem to consider here is the attitude of organizational personnel in general toward linkage itself. A special effort might be required to encourage individuals to accept the notion of linkage in their basic attitudes toward their own and other organizations. In the public schools, interest in linkage is not universal; presently, career and vocational education personnel are probably most supportive. However, if EE teachers recognize that a holistic* approach is implicit in EE subject matter, they may also be among those who are positive about interorganizational cooperation. In non-formal educational organizations, an interest in linkage is also not shared by everyone. Therefore, in both kinds of agencies, care must be taken to deal with inherent resistance to linkage efforts.

2. Specify the Set of Organizations with Potential to Solve Problems

Once you have decided that your organization has the potential, need, and motivation for establishing a linkage arrangement with another agency, you

*An approach that attempts to clarify the complex relationships that exist between natural systems and human systems by examining the components and reciprocal functions of both.

can look at possible organizations with which you might seek cooperation.

A linkage facilitator may approach other organizations or individuals from within a school district who have a special interest and knowledge in the environmental education areas and can develop a list of organizations having the potential to solve the needs or problems that have been defined. An initial list can be determined by brainstorming; e.e., by listing all potential helpful organizations. Evaluating their capability for linkage need not be done at this time, although this type of assessment will be the next step.

3. Meet with Organizations to Ascertain Interest

A school, or school district, could consider holding a "Back-to-School" meeting to which interested administrators and faculty would invite representatives of potentially helpful community agencies to discuss possible ways these agencies could be involved in EE linkage arrangements. Those agencies that express an interest could then be involved in further meetings.

As an alternative, depending on the availability of time and personnel, some or all of the organizations identified as relevant can be approached individually regarding the possibility of cooperative effort. Organizations can be asked if they would be interested in working with your school district in a cooperative arrangement in the environmental education program. The possibilities for coordinate programming could be discussed, and the motivation level of the organization could be assessed.

Because the issue of motivation is crucial, each organization's motivation for participation in the linkage arrangements is important. Linkage efforts seem to work best when the organizations are highly motivated to participate, and when the motivation level of each organization is about equal. A linkage facilitator can help move organizations toward this balance, although they may find that a true balance is not possible. In any case, organizations should be

chosen with this ideal in mind.

It is also important to remember not to oversell what your organization has to offer. Expectations, promises and commitments should be as clear as possible to all the participants in advance. In an attempt to interest an organization in becoming involved in a new program, it is easy to paint an overly bright picture of what they can gain from it. It would be better to err on the negative side so that unexpected gains are bonuses. A related problem is that, at the beginning of the linkage negotiation, everything about the linkage effort cannot be known, and some people may be uncomfortable with that uncertainty. In any case, an attempt should be made throughout the linkage arrangement to be realistic about the possible outcomes, and periodic checks should be made to see that expectations continue to be realistic.

If it seems possible for you to work with a given organization, this might be the time to administer a survey to assess this organization's environmental education program. Questions asked are similar to those asked by a school district, but might be revised to reflect the structure or other aspects of an organization informally involved in education. Such questions might be:

- Does your organization have a program in environmental education? Is the program well-defined, with identifiable goals and objectives?
- At what levels in your organization are environmental education programs carried out?
- List other environmental education programs operated by your organization but not discussed in either 1 or 2 above.
- What EE activities or training programs for leaders have been built into your regular program materials or events?
- Do you have an environmental education coordinator, study committee, task force, or some other specially designated group for EE focus?
- Did your organization cooperate with schools and/or other organizations in EE during the year?
- Does your organization have anything that might be called an "environmental education resource file?"

If the organization's representative(s) cannot give positive answers to a majority of the above questions, you may need to look elsewhere for a stronger environmental education program.

If you conduct surveys of the environmental education programs in both organizations and decide to continue the linkage effort, you can use the information obtained from them in later linkage tasks, such as that of comparing goals and objectives of the two programs.

4. Determine Which Organizations Will Participate and Obtain Commitments from Organizations to Enter Linkage Negotiations.

Once the approach to a non-formal organization is made and interest is established, the primary goal should now be to obtain the commitment of both organizations to enter linkage negotiations.

If interest in the linkage effort continues to be high, representatives of the two organizations at other relevant levels (i.e. the district level, the county level, etc.) can be contacted. Some or all of these representatives should then form a "boundary personnel committee."

5. Arrange for Group Meetings with Boundary Personnel.

Once the decision has been made to look closely into the possibilities of linkage between two or more specific organizations, each organization can form its own group of boundary personnel. As defined in the model, boundary personnel are people in each organization who represent their organization to the other agencies or organizations. Such boundary personnel should be chosen on the basis of their familiarity with their own organization, their ability to represent it accurately and their power to carry out decisions made by participating organizations.

The selection of the people who will be involved as boundary personnel is very important. Inaccurate assumptions about the roles people play within organizational structures are easy to make. For example, a representative of

a non-formal agency might assume that a superintendent of schools has unlimited power to direct a district to participate in a project. However, the role of the school board must always be considered and, if the school district is decentralized, individual school principals will have a large say in what is or is not offered in their own schools.

Carefully forming the small groups will greatly affect the success of the linkage. Group members need skills to explore linkage alternatives and to choose and implement programs. Group members are most effective when they have the following abilities and knowledge:

- The ability to work together in a team effort.
- A knowledge of smaller divisions in their own organizations (e.g. knowledge about how the classroom operates).
- A knowledge of general operations (i.e. how the organization operates to maintain itself).
- A knowledge of legal and other technical areas that might need to be explored.
- An ability to analyze existing programs, and to plan carefully and creatively.
- Skill in group management and conflict resolution.
- An ability to open doors to decision-makers.
- Credibility with those individuals the member is representing.
- An ability to communicate well with others.
- Approval of and support for the goals and concepts of linkage and environmental education.

The group, as a whole, should:

- Maintain accurate records of the meetings.
- Represent all levels and groups that will be affected by the program.
- Represent the most successful environmental education programs.

Obviously, people who are excited about a program will make it work better than people who are not. Therefore, care should be taken to recruit

interested people. The committee will require a great deal of time, energy, and creative spark, and members will need to be highly motivated to sustain that enthusiasm. It is also important that the members from each organization be about equally motivated. For example, highly motivated teachers matched with poorly motivately members of the linking organization(s) may become discouraged at any lack of enthusiasm or cooperation. At this point, an all-out effort should be made to find people who are actively involved in both organizations so that the linkage process can be facilitated even before meetings begin.

Boundary personnel can include representatives from all levels of any participating organization. These people should be involved early on in the linkage effort, even though a person at a particular level of the organization may not appear to be involved in or obviously affected by the linkage activity.

For example, school principals may not be working directly with the environmental education program nor with the linkage program and, therefore, may not be considered in organizing boundary personnel meetings. However, because the principals' schools and staffs will be affected by any linkage program activities, those principals will be concerned. If they are included in the program design, they may be able to contribute to the project plans, especially in providing a program overview and in giving institutional support.

Similarly, in the non-formal organization(s), various levels of personnel should be included in the first meetings. They will probably need to be involved in plans that would affect their positions, and they, in turn, can offer information that will be useful in developing the linkage effort.

At early meetings, invitations should be extended to administrative level personnel, such as the superintendent of schools. After the first few meetings, an information flow should be established to people who should be kept informed

of the progress of the project. Board members and administrators can be placed on this list.

Exploratory meetings might be scheduled at the end of one school year so that a working relationship may be more easily established early in the following year. It should be kept in mind that any interorganizational program requires a great deal of preparation time, and boundary personnel may become discouraged if things seem to be progressing slowly.

Since people have time limitations, meetings should be well planned. Waste and delay can be kept to minimum by polling member before each meeting to determine their agenda priorities. Written agendas can then be prepared to guide the meetings in a general way.

The linkage facilitator and coordinators should remember that, in any experimental or new program, there is anxiety about failure. People who are starting a new program, and are thus presenting something new to their organzation and to the public, are bound to be concerned about its chances for successs. Anxiety will increase as highly visibly events in the linkage effort approach. About this time, complaints and hesitations may increase. Committee members may require extra reassurance and support from the linkage faciiitator or linkage corrdinator(s).

Since committee members seem to work better if they can perceive immediate rewards, it may not be enough to see some overall general gain for the organization, for the learner, or for the committee member. It is probably also not enough to demonstrate the value of a linkage effort only once. Immediately perceived rewards must be emphasized regularly.

Participating agencies should also identify a group of support people who will organize meetings, take notes, report on meetings, handle clerical tasks, gather and analyze data, communicate among the various representatives

of the organization(s), and in general, provide the services that are necessary to an ongoing linkage program.

If at all possible, boundary personnel can be freed from some of their regular job duties, since the amount of time required to design and implement a linkage project may be more than anyone anticipates at the beginning. If time is alloted for meeting and planning together, participants may avoid feeling overwhelmed by the demands of the linkage effort and can thus manage to sustain the necessary motiviation.

At this point, participating agencies should have engaged in enough exploration of the costs and benefits of a linkage program to be able to make a decision either to continue the linkage effort by moving into a trial cycle or to drop it.

TRIAL CYCLE OF LINKAGE ACTIVITY

1. Outline Linkage Approach and Roles (Conduct any Training Needed)*

The boundary personnel need to learn as much as possible about linkage before any work begins on the actual development of the linkage effort. Participants can be introduced to the general approach and the outline that will be followed in designing the specific linkage program. The objective here is to assist participants in understanding generally where they are going and what the process will be. Representatives from all organizations can be invited to an initial meeting or meetings where this instructional process occurs.

Written guidelines for the linkage process will probably be useful for the boundary personnel. If written guidelines can be consulted regularly, some confusion is eliminated. The linkage facilitator and/or the coordinators can

*See pp. 47-51, Final Report: Linking Formal and Non-formal Education Sectors for the Advancement of Environmental Education. San Francisco, Ca.: FWL, 1977.

begin to think of ways to make others comfortable with them too. Initially an outline of a particular linkage approach and particular linkage roles might be presented to participants.

Training in how to go through the linkage process might also be conducted at this point. Since linkage requires specific skills, any training program would focus on problem exposure within the functional context of linking organizations, and on the experiential, rather than the abstract or theoretical mode.

2. Obtain Domain Consensus

The participating agencies in the linkage activity should be in agreement that each agency has the legitimate responsibility to carry out certain activities and functions.

It would be best to write out this agreement so that each organization is very clear about its own responsibilities as well as the responsibilities of the other organization(s). This written agreement can be one of various written statements made throughout the linkage effort, leading up to the final negotiated contract.

3. Outline the General Task Environment of Each Organization

A first responsibility for boundary personnel would be to gather the documents that are required to look carefully at the general task environment of each organization. Such items might include:

- an organizational profile of the organization (including various levels within the organization);
- a description of the overall goals and programs of the organization;
- a statement of guidelines or frameworks, especially in EE content areas;
- policy documents that may affect the conduct of the linkage activity, and
- specific implementation guidelines relevant to the above items.

When these documents have been collected, each set of boundary personnel can study them and present a representation of their own organization to the others at joint meetings.

There are several difficulties in this process of representing the organization. Such representations might include a delineation of each organization's concerns and perspectives, general goals, functions and activities, resources, organizational structures and programs. The personnel may be so close to the structure of their own organization that they overlook certain functions, goals, or resources that need to be explained to those outside their organization. They may consider other functions or goals, but not perceive their relevance to linkage. The objectivity of the linkage facilitator may prove useful here. Another problem is that organizational weaknesses be found by boundary personnel, who may be reluctant to convey those weaknesses to the other organization(s). Deficiencies may relate to such organizational aspects as structure, communication processes, program content, staffing arrangements or goals. For valid organizational reasons, there may be a tendency to allow those weaknesses to remain hidden. If they are not brought out and accounted for in plans, however, they may cause difficulties in the implementation stages of the linkage program.

While boundary personnel are studying their own organizations, they should look to see where linkage may be able to contribute to helping the organization maintain itself. Organizational maintenance goals and objectives tend to operate on a more or less unconscious level in the organization and may thus be easily overlooked. Administrators are probably the best people to ask to identify these goals and objectives since maintaining the organization is

their responsibility. Such areas as staff development, stocking and maintaining supplies, reporting on events and organizational philosophy, fulfilling staffing demands, and--in the case of volunteer organizations, fund-raising and training of volunteers--need attention if the organization is to survive. If personnel are operating at peak level simply to meet the basic survival needs of the organization, they may balk at being asked to assume an additional work load to effect linkage, unless the linkage process or program itself actually eases the work load necessary for maintenance.

4. Analyze the Specific Task Environment of Each Organziation Relative to the Linkage Problem

When the general task environment of each organization has been mutually defined and explored, the specific linkage problem areas of environmental education can be approached. Relevant goals and functions should be examined.

The goals and objectives of each organization's EE program can be extracted from program ma erials. A content analysis of existing materials may be the best way to accom lish this. However, this task requires time and certain skills that may n t exist within either organization. If this is the case, this funciton might be fulfilled by the facilitating organization.

Goals and objectives of the EE programs can be listed. One approach is to place goals and objectives into three categories: attitudes, skills, and knowledge. Once established, these categories enable boundary personnel to determine overlap in the organizations' goals and objectives. Goals will differ on various organizational levels--on the learner level, for instance, as opposed to the institutional level. An example of a learner-level goal might be for learners to become more aware of environmental problems, and an example of an institutional-level goal might be to open up a new environmental study area to be made available to all schools in a district. These differences

in goals should be noted. Charts comparing goals and objectives will clarify overlapping, complimentary and supplementary areas.

Analysis done verbally in group situations can help everyone deal with the issues and ensure that everyone "speaks the same language." The general thrust of the linkage effort will help to structure this analysis to determine the specific goals and objectives of the linkage effort itself.

This is also the stage at which all possible resources should be considered. Boundary personnel must look at their own organization's resources from the perspective of each of the other organizations. Resources can include facilities, materials, personnel, services, connections within the community, community networks, courses, already existing linkage arrangements, etc. Sharing of resources can take place on various levels, including the instructional as well as the conceptual levels.

5. Specify any Constraints, Limitations or Unique Situations that may Affect the Linkage Process

If potential constraints or conflict areas are identified in advance, plans can be made to deal with them. Trouble-shooting may help the project to avoid operating in a crisis mode that requires responding to, rather than preparing for, problems. For example, legal constraints on the schools regarding insurance responsibilities might affect linkage plans, as would other administrative considerations. It might be valuable to invite the legal officers of each of the organizations to discuss legal matters and answer questions. A second area that might come up entails establishing the criteria for granting credit to students in linkage programs that involve non-school activities. A major concern is how to maintain strict accountability. Other potential administrative problem areas include information about insurance, budget, school holidays, and organizational calendars.

Problems may also arise within the boundary personnel group itself. Members

of the group who fail to show up, come late, leave early, or do little work, may annoy others. Administrators are often "guilty" of this kind of behavior since their job frequently requires them to "get things rolling," and leave. Problems caused by this should be discussed early in the project. Obviously, tasks should be assigned early enough to allow boundary personnel to meet their deadlines. Monitoring by the linkage facilitator may help in meeting deadlines.

If a member of the boundary personnel group has a "hidden agenda," it may weaken or detract from the linkage process. Again, administrators may be most likely to be "guilty" here. They may be as interested in "spin-offs" from a given program as they are in the program itself, and therefore may not focus their full effort on the success of the linkage program. They may want, for example, to contact the facilitating organization rather than the organization for whom the linkage was designed, and thus may use the linkage effort to accomplish that goal. An administrator with this priority would probably see the linkage program as successful if such an interaction occurs, regardless of the success or failure of the linkage program itself.

Scheduling meetings can also cause difficulties. Boundary personnel may not be regularly available for meetings at the same time. For example, teachers may have "release-time" to meet during the day or late afternoon. However, many workers in non-formal educational organizations are volunteers and cannot miss their regular employment for daytime linkage meetings. Furthermore, they are often committed to a great deal of volunteer time in the evenings and on weekends and will thus be unable to give additional time to the linkage project. The problem of arranging and coordinating a schedule agreeable to all parties may be a strict limitation on any linkage effort. Particular problems in scheduling as well as individual personality conflicts may need to be dealt with, and it is highly useful to have some strategies prepared for handling these situations as they arise.

Special needs of volunteers, mentioned above, must be recognized. Because of time pressures, volunteers may want pre-packaged programs. They may not want to be involved in a joint effort to develop new ideas. Professional educators, on the other hand, often welcome program development sessions where they can deal with content areas on a conceptual level rather than on the practical one required by the daily classroom demands. In this spirit, educators may resent the attitude of some who wish only to be "told what to do;" whereas volunteers may resent educators who seem to "just want to sit around and talk about great ideas, and don't do anything." The two groups, then, may have opposing needs and conflict may result.

Communication problems within the group may occur because of differences in language style. Educators, especially, may use jargon that is not clear to nonformal educational organizations. The resulting communication gap might be bridged through the establishment by the group of a common terminology.

A special problem arises if the linkage effort originally involves a limited number of people. Members of each agency who are not directly involved may need an explanation of why the limitation exists. Otherwise, they may be envious of special programs and concerned when they are not included in them. While limited participation may present a problem initially, it may become advantageous if the linkage program is successful, since new participants may see involvement as a privilege rather than an obligation.

An analysis of the task environment may reveal that operations of an organization are cyclical rather than linear in nature. If so, this information can be used to advantage so that linkage demands are scheduled to coincide with periods of relative organizational calm.

Analysis of the task environment, then, can uncover limitations, constraints or other unique situations that may affect the linkage process.

6. Based Upon Previous Discussion, Design Linkage Configurations

The design of the linkage configuration of a linkage program may be done in any number of ways. For example, a linkage facilitator might suggest several different configurations and present them to boundary personnel for discussion, adaptation, or adoption. Or, representatives from one of the linking organizations could propose a program to the other linking organization(s). Or, one linking organization might examine an already working program within its own or other organization(s) and suggest ways in which the program could be augmented to the advantage of all. It is also possible that two or more organizations might want to share expertise to develop a totally new program of some sort.

There are certain advantages to having the linkage facilitator take a guiding role in the design of the linkage program. He or she is likely to recognize the value and practicability of building upon existing programs rather than starting new ones. Personnel within the organization, on the other hand, may be more inclined to use the linkage process to begin new programs which may prove to be quite unrealistic. The facilitator's experience in the linkage process provides the perspective to establish realistic goals, expectations and limitations for linkage and to propose design alternatives for boundary personnel to consider.

Because new task areas may require new management and other structures, they probably should not be undertaken as an initial linkage effort. A better focus might be upon using the linkage to find new ways to do tasks already desired by the organizations. If new task areas then grow out of that effort, they can become an integrated part of the second stage of the

linkage process. If responsibilities have been handled more efficiently because of the linkage, personnel may have time to assume these new tasks.

Using parameters that have been determined by boundary personnel, the facilitator can propose a range of alternative linkage configurations from those requiring a low level of interaction, commitment and time through those requiring a high degree of interaction, commitment and time. Boundary personnel can then make choices, or incorporate aspects of various alternatives into a new plan.

7. Select One or More Linkage Configuration(s) (or Programs) for Implementation.

The entire Design/Coordination Committee should be involved in the selection of the final plan for linkage. This is a difficult and time-consuming process, but a crucial one, which should be carefully done. If it hasn't already been done, this may be the time to choose a linkage coordinator to represent each organization. The duties for this position can be specified by the boundary personnel and clearly written down. An entirely new position may be required within each organization, or these duties may be incorporated into an existing position. If the linkage effort becomes permanent, a permanent coordinator will probably be necessary.

Qualifications of the linkage coordinator to consider include the following:

- The ability to run a meeting.
- The ability to analyze and compare structures, functions, and goals and objectives.
- The ability to work with others.
- The time to manage the linkage effort.
- Accessibility to group members.
- The willingness and ability to get directly involved in operational tasks

- The ability to interact comfortably and effectively with others.
- A good overview of the present EE program.
- Agreement with the concepts of environmental education and linkage.

From the many possible linkage configurations, boundary personnel and the organizations they represent will need to agree on one specific course to follow. At this stage of development, boundary personnel will be called upon to discriminate, selecting among suggested (or brainstormed) linkage configurations.

In order to guide this process of selection, boundary personnel may want to review specific findings from steps 3, 4, and 5. If at all possible, boundary personnel should select a program that is consonant with their own goals as well as those of the organization.

It would be worthwhile, at this point, to look carefully at any constraints, limitations or unique situations that might affect implementation of the selected linkage plan. It can be difficult to anticipate program difficulties, strengths and weaknesses at this state in the linkage effort. However, attention given to problem areas early in the linkage activity may minimize the difficulties when the program is put into effect. In fact, success in the implementation stage may depend upon how well this step is thought out.

8. Restate Goals/Objectives for Each Implementation Configuration

The previous step may have developed an entirely new linkage configuration or configurations. It has, at the very least, developed new components of the original configurations considered by the boundary personnel. Consequently, the goals and objectives for each plan must be re-evaluated and restated. Boundary personnel should seek to hear disagreements and conflicting goals, address problems, and reach a consensus.

This is another critical step in the linkage process: agreeing upon the goals and objectives for the selected linkage configuration. This step, like step 6, may be accomplished in any number of ways. Each organization might present a list to the other(s), or each organization and the linkage facilitator might prepare such a presentation. Another way to arrive at goals and objectives might be by discussing each possibility and adopting those agreed upon verbally by the group.

It is important that participants see a need for the proposed effort and that they see that they and their organization will benefit from the linkage. It is equally important, however, to avoid two pitfalls. One of these is the danger of unrealistic expectations. If goals and objectives are unrealistically high, participants may be setting themselves up for disappointment and feelings of failure. Another pitfall to avoid--throughout the linkage, but especially at this phase--is that of miscommunication among organizations and/or their boundary personnel. Accustomed to planning within the context of their own organization, boundary personnel would be wise to advance more cautiously in initial dealings with outside organizations. Not only may standards, resources and facilities vary from organization to organization, but boundary personnel may employ similar words to mean different things.

A corollary to this problem is the fact that having established reasonably good communication lines between their organization and the other(s), they must also remember that the linkage vocabulary may be foreign, or even threatening, to their co-workers not directly involved in the linkage effort.

9. Agree Upon Standards for Quality of Linkage Program

Standards of quality will be implicit in the goals and objectives for the linkage effort. The minimum standards for a successful program, if

explicated, will further clarify the program and provide a comparison of the expectations of the two organizations. If levels of expectation differ significantly, program adjustments may be needed until a workable agreement can be reached. As in step 8, difficulty may lie in finding a common vocabulary.

10. Specify and Agree Upon Structures, Roles, and Responsibilities Necessary for Attaining Goals and Objectives

After a program has been selected, an operational plan can be developed that would include planning, testing, initial try-out and follow-up stages. Boundary personnel, working from a description of the program, the goals and objectives, and the minimum standards of quality required, can define the structure of the program and their own roles and responsibilities within that structure.

The required tasks can now be assigned. If those tasks are specified in writing and individuals are asked to respond to them in writing, clarity and commitment can be enhanced. The linkage coordinator for each organization might supervise the completion of the tasks and, in turn, be supervised by the linkage facilitator. The facilitator can monitor overall progress, keeping in touch with the organizations' needs and responsibilities. The coordinators and the facilitator can also be alert for individuals who need support to successfully complete their tasks. People need frequent contact with the coordinator and/or facilitator. Otherwise, linkage becomes a remote goal and assumes a low priority in comparison with daily job demands.

If the people directly involved in a linkage program or events are in direct contact with each other, communication is likely to be most efficient. If intermediaries relay messages from representatives to representatives and vice-versa, some confusion might result. The linkage facilitator should be included, especially at the beginning of the project, so that interaction does

not bog down in misinformation, lack of motivation, etc. However, the facilitator may be able to gradually withdraw so that more direct communication is established as soon as possible.

Boundary personnel can be considered not only in terms of their membership in the organization they represent here, but also in terms of their other memberships and contacts that might extend linkage arrangements, such as service organizations or business or civic interests.

At every point in the linkage process, the facilitator has the difficult job of assessing the degree of responsibility each organization and each individual is willing to assume. The complexity of this problem relates to the complexity of the linkage arrangement, the duration of the program, and the number of people involved. If an incorrect assessment is made--and responsibility is inappropriately given or taken away--the facilitator must also respond to that problem.

Monitoring the responsibilities of a group of individuals in an on-going, varied linkage program can prove to be a full-time job. Even when it may seem appropriate to transfer the responsibility for the administration of a specific series of events to other boundary personnel, it may not be feasible to do so. Any new responsibility may involve work for an individual beyond the original expectations for the program. Responses may threaten the program, and necessitate the facilitator's maintaining or reassuming various basic responsibilities. While many tasks may perhaps be more efficiently and more appropriately done by the organizations, demands might be impossible for them to fulfill.

At this point, goals, objectives, structures, roles, and responsibilities again become a concern. This time, however, the concern is related primarily to the linkage program (or configuration) the committee has chosen to implement.

Establishing visible and usable feedback channels will encourage participants to report frequently to their linkage coordinator or to the facilitator. A procedure for such reports, including an understanding of their purpose and value, will help assure relevance and avoid reports that are merely busywork. The facilitator, the linkage coordinators, and even the boundary personnel should not assume that communication will take place without a conscious effort to encourage it. Specific tasks for a specific person will depend on the person's new role within the linkage arrangement. Both tasks and roles should be defined.

A monitoring system can be devised to keep close touch on the program. This might include observations, logs, notebooks, calendars, interviews or regular phone calls. Standardized forms may facilitate this record-keeping process. Whether the facilitator or linkage coordinators solicit written reports or other types of information, they should themselves report progress to participants. If participants know that their work is being recognized, they are more likely to feel supported. Communication between and among project participants and others can be established through use of some of the following methods and materials, any or all of which could be included in a comprehensive communication plan:

- A newsletter reporting activities and results to participants in the programs.
- Regular progress reports to local review committees and consultants.
- Distribution of a project brochure to EE personnel in formal and nonformal sectors.
- Distribution of information on linkage/coordination materials.
- Production and distribution of a filmstrip documenting the process of linkage.
- Reports on your group's activity in appropriate professional periodicals, at educational conferences, and at meetings of participating organizations.

11. Set Up Communication/Feedback Channels Needed to Implement Linkage and To Monitor The Linkage Process

The area of communication in general may be one of the most important and difficult problems throughout the linkage process. At the beginning of any new program, misinformation and unrealistic expectations can result from ignoring communication demands. Not only might the public have a misperception of the project, but boundary personnel can also be misinformed.

Since local media are often especially receptive to community news, one way to explain the linkage effort is to send publicity to community media, as well as to school publications. You may find that local television, radio and newspaper coverage of either your linkage effort as a whole--or perhaps a specific linkage event or activity--is possible. Promotional releases written by you in advance may convince slightly reluctant reporters that your activity is newsworthy.

Communication among project participants will help everyone understand what each organization expects of the other and what each is capable of contributing to the linkage effort. Contact may need to be maintained not only with boundary personnel, but with others in each organization. For example, if students are involved in programs having special requirements, their parents may need to be informed.

Communication between the linkage facilitator and boundary personnel will be enhanced if the facilitator is careful to keep commitments made to them and to their organizations. If any commitments cannot be kept, the facilitator should so indicate as soon as possible, since loss of credibility could seriously damage the success of the project. Boundary personnel should do the same in dealing with others.

Communication is a key to success at this stage of linkage. It is possible that each committee member feels busier and more over-burdened than the next. This feeling, of course, may be correct; denying the facts (or perceptions) may result in individuals feeling not only isolated but unappreciated as well. Communication is a tool with which these feelings can be eased. The more boundary personnel talk to one another, the more they can see that others are also working.

Depending upon the configuration chosen, boundary personnel may find that even more effort is required during the implementation stage of the linkage project. To avoid panic during the flurry of activity associated with beginning a new program, tasks can be specifically defined and committed to writing well in advance of the opening activities. These written task sheets might list:

- the task involved;
- the person primarily responsible for accomplishing the task;
- other boundary personnel committed to help the task coordinator;
- the date and time this task will be accomplished;
- component tasks; and
- alternate strategies.

Hopefully, the learner level has been considered throughout the linkage program planning. However, a specific aspect of learner-level involvement may have been overlooked: motivation. If you have not already done so, you may wish to consider establishing an award system at this time. If so, it is important to delegate responsibility for the handling of awards carefully. Clarity of purpose is of primary significance here. Be sure that quality measurements are standardized and clearly understood by participants.

Public relations efforts are important, since such people as parents of participating students, educators, and the community in general need to be kept informed. When outsiders request detailed information about the program, the linkage facilitator and/or the linkage coordinators, along with selected boundary personnel, can consider responding as a team. Each participant functioning at a different level in the project can contribute information that the others do not have. The facilitator, for example, may have an overview of the project; the coordinator may present the organization's perspective; and the on-site person can give specific information about a program or event.

12. Set Up Evaluation System

Early in the project, evaluation plans can be discussed. Setting up evaluation requirements at the beginning of the linkage helps clarify--and in some cases, even determine--linkage goals.

It will be important to evaluate progress as you go along. Evaluation of the overall effort and end results may aid future linkage attempts, but on-going evaluation can aid the linkage effort along the way. In order to get as much value from the evaluation as possible, begin the process of evaluation as soon as you can.

In addition, deciding early the information that is needed, and the means for gathering it, may keep the group from letting some event or project phase slip by undocumented. Necessary tests, questionnaires, etc. for validating the linkage effort may need advance preparation. For example, pre- and post-testing may be desired to determine changes which occur in certain areas relevant to the linkage effort. Such tests are not easily developed and may require the assistance of evaluation specialists.

Evaluation parameters and procedures of the linkage should be established to make best use of the feedback information along the way. A sub-committee on evaluation could formulate plans and submit their findings and recommendations to the larger boundary personnel group for approval.

A top priority will probably be to devise some type of monitoring system through which close contact with the linkage activities can be maintained. Strategies that can be developed to gather this information might include those mentioned in step 11 (observation, logs, notebooks, calendars, interviews, or regular phone calls) and others such as verbal reports at in-service training meetings, questionnaires, or information sheets.

Attempts at eliciting information will probably be most successful if on-site personnel participate in developing comprehensive but non-threatening instruments. Language used in these instruments should be familiar to both respondents and evaluators. Anyone developing the instruments should ask only for necessary data. If needlessly overburdened, respondents and evaluators may become alienated and discouraged with the linkage effort.

The evaluation might also include a straightforward documentation of the linkage effort in photographs, a narrative report, and notes from interviews with participants, etc. Such a documentation would illustrate to others what has been accomplished by the linkage. It would thus satisfy one primary concern of most educational organizations today--that of accountability. Documentation might also become part or all of a training program to later introduce to other personnel within the organizations--or boundary personnel from other organizations--techniques for accomplishing interorganizational linkage.

13. Try Out Linkage Activity

Although to "try out linkage activity" is a simple statement and occupies no more space here than any other, this step in the linkage process is one of

the most complicated and difficult. It is, in fact, the culmination of all preceeding steps.

During the try-out stage, the linkage plans are tested and under time pressure, many adjustments may be required to handle unanticipated problems. A trouble-shooting team, comprised of the linkage facilitator, the coordinators, and representative boundary personnel, might be formed to provide consultation to other project participants during this time. If individuals felt they could not handle a problem themselves, they could refer it to the trouble-shooting team at regular meetings scheduled to deal with such eventualities.

Care should be taken to see that participants do not feel isolated during the try-out stage. Up to this time, the focus has been on meeting as a group over a period of time to design linkage activities in environmental education programs. Now, the plans may require individuals working separately, and participants may experience the linkage try-out effort as fragmentary. Unless there is continued interchange via group meetings and discussion during this time, participants may develop an isolated view of the project. The continuation of regular meetings during the try-out can give people opportunities to share concerns, problems and successes. Through this sharing process, feelings of isolation may be avoided. The facilitator--and, to a lesser degree, the coordinators--may be the only people whose roles give them a comprehensive overview and thus allow them to see the linkage effort in a unified way. It will become their responsibility to communicate this unity to everyone concerned.

Also, in a program such as this one, there is the possibility that participants, as well as organizational and community observers, will see one of the parts--such as a series of coordinated, highly-visible events--as the <u>total</u> linkage effort. Public relations statements within the boundary personnel

group, the organization itself, and the communities involved might attempt to clarify or emphasize the total project.

14. Provide Evaluation Feedback

By now the evaluation channels will hopefully have produced a good deal of data. At this stage the evaluation may be formative, summative or both. Evidence may show intra- as well as inter-organizational linkage activity, or may suggest that some aspects of the linkage effort were more successful than others. Whatever the information you received through evaluation channels, feedback must be provided to participants.

Evaluation feedback can provide validation and closure for a program, as well as indicating the possible future directions a program may take. Results communicated to participants will allow them to plan future projects more effectively. Without such communications, they may simply repeat mistakes. If feedback instruments--questionnaires, tests, etc.--are quickly tallied, analyzed, and reported to participants, adjustments can be made in time to affect future linkage efforts among the organizations.

Evaluation might also include programs or events that have grown out of the original linkage efforts, whether or not they were originally specified. Existing programs and events may have also been recognized as relevant and incorporated into the linkage effort.

15. Adjust Linkage Configuation as Required

If what is happening in the linkage program is not consonant with the selected linkage configuration, adjustments in one or the other may be required. They should adjust the linkage configuration and alter the program. Suggestions or ideas for possible improvements can be gathered. Follow-up meetings of boundary personnel can focus on the adjustments called for by evaluation conclusions as final step before formalization of the linkage arrangements is considered.

If new representatives of the two organizations join the linkage efforts at this point, experienced boundary personnel can use the discussions of needed adjustments in the linkage arrangements as training sessions. They may also consider other ways of introducing linkage concepts as practices to those people who may be interested but inexperienced. Boundary personnel may recall their own reactions, needs and confusion when they began. They may remember, for example, the importance of providing immediate rewards for each organization and for the boundary personnel involved.

This is also the time to consider dissemination of the project idea to other educational groups who may want to join the on-going linkage or who want to establish their own linkage arrangements. Visual project documentations discussed earlier might be effective in dissemination efforts.

FORMALIZED COOPERATIVE ARRANGEMENTS

At this point, the linkage arrangement has been designed, developed, tried out, evaluated, and adjusted. The two or more organizations can now consider institutionalizing the arrangement. Since linkage implies a set of ongoing activities and requires organizational changes and agreements, it seems imperative to make institutional provision to ensure the successful continuation of the linkage effort. Such provision guarantees that linkage activities will be an integral part of the organization's ongoing plans. A "statement of agreement of formal cooperation" between the organizations involved may be needed. Such an agreement can, in fact, be considered a primary goal of a linkage program.

While institutional-level agreements in various forms may have been made throughout the program on a short-term, limited, or informal basis, one or both organizations may ultimately recognize the value of this more formalized

arrangement. The linkage facilitator might present the issue for their consideration near the end of the first phase of the linkage program--probably after one school year.

Boundary personnel can consider the benefits and costs of formalizing the arrangement. As identified by the linkage model, an underlying benefit is that the formalized linkage arrangement is no longer dependent on the individual or even on the small group effort. Rather, it achieves its own coherence. The related cost to be weighed here is the possible loss of program flexibility and spontaneity. The arrangement loses some adaptability. Every effort should be made to maintain an appropriate degree of tension between these two dimensions. Efforts at this point should focus on maintaining the balance in favor of the benefits.

BIBLIOGRAPHY

Aiken, M., & Hage, J. Organizational interdependence and intra-organizational structure. American Sociological Review, 1968, 33, pp. 912-930.

Aldrich, Howard. The environment as a network of organizations: Theoretical and methodological implications. Paper presented at the Research Committee on Organizations section of the International Sociological Association meetings, Toronto, Canada, August, 1974.

Beal, G. M. Interorganizational coordination. Department of Sociology, Iowa State University, Ames, Iowa. Paper presented at a conference on Agriculture in a Quality Environment, Cedar Rapids, Iowa, 1972.

Boyce, V. M. Utilization of voluntary leaders. 4-H Youth Development Extension Service, U. S. Department of Agriculture, 1972.

Dillman, D. A. Systematic linkages between voluntary associations: A theoretical model. Ames, Iowa: Iowa State University, 1966.

Finley, J. R., & Capener, H. R. Interorganizational relations: Concepts and methodological considerations. Paper presented at the Annual Meeting of the Rural Sociological Society, San Francisco, 1967.

Halpert, B. P. Interorganizational relationships: An interactionist approach. Paper presented at the American Sociological Association meetings, San Francisco, August, 1975.

Katz, D., & Kahn, R. L. Organizations and the system concept. In Brinkerhoff, M. & Kunz, P., Complex organizations and their environments, 1972, pp. 35-47.

Klonglan, G. E., & Mulford, C. L. Emphasizing interorganizational cooperation for social action. Perspective on aging, 1974, 3, pp. 6-9.

Klonglan, G. E., Mulford, C. L., Warren, R. D., & Winkelpleck, J. M. Creating interorganizational coordination: Project report (Sociology Report No. 122A). Ames, Iowa: Iowa State University, 1975.

Klonglan, G. E., Paulson, S. K., & Rogers, D. L. Measurement of interorganizational relations: A deterministic model. Paper presented at the American Sociological Association meetings, New Orleans, 1972.

Rogers, D. L., & Vacin, G. L. A deterministic model of interorganizational relations: An application to the community development process. Ames, Iowa: Iowa State University, 1972.

Warren, R. L., Burgunder, A., Newton, J. W., & Rose, S. M. The interaction of community decision organizations -- some conceptual considerations and empirical findings. Waltham, Mass.: Brandeis University, no date.

Young, R. C., & Larson, O. F. The contribution of voluntary organizations to community structure. American Journal of Sociology, 1965, 71, pp. 178-186.

Zimmerman, J. F. The cooperative approach to environmental enhancement. Final report on the National Conference on Managing the Environment, 1973.

PART THREE

STUDY REPORT

ENVIRONMENTAL EDUCATION CONTENT
IN THE MATERIALS AND PROGRAMS OF
SCOUTING/USA

ANALYSIS AND RECOMMENDATIONS

STUDY REPORT

ENVIRONMENTAL EDUCATION CONTENT IN THE MATERIALS AND PROGRAMS OF SCOUTING/USA

ANALYSIS AND RECOMMENDATIONS

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The purpose of this study report is to analyze the environmental education (EE) content in the materials and programs of SCOUTING/USA. The analysis is presented in three sections.

Section I lists objectives as they have been interpreted from relevant Scout materials and program descriptions. These statements are presented within a framework provided by a federal report, Fundamentals of Environmental Education, developed by the Subcommittee on Environmental Education of the Federal Interagency Committee on Education (FICE)* in November of 1976. The stated purpose of the report -- herein referred to as the FICE Report -- is to " . . . set forth fundamentals about environment that informed citizens need to understand in order to deal with the wide variety of environmental issues confronting them today."

Section II discusses the above comparison between Scouting's EE program and the fundamentals stated in the FICE Report, and comments on and makes suggestions regarding Scouting's EE program.

Section III presents an annotated list of those Scouting materials from which all objectives and EE program descriptions were taken. The selection of those materials to be considered environmentally relevant was made by SCOUTING/USA.

*The functions of FICE are: ". . . to improve coordination of the educational activities of Federal agencies; to identify the Nation's education needs and goals; and to advise and make recommendations on educational policy to the Secretary of Health, Education and Welfare and, through him to heads of other agencies and the President."

SECTION I

ENVIRONMENTAL EDUCATION OBJECTIVES OF SCOUTING/USA

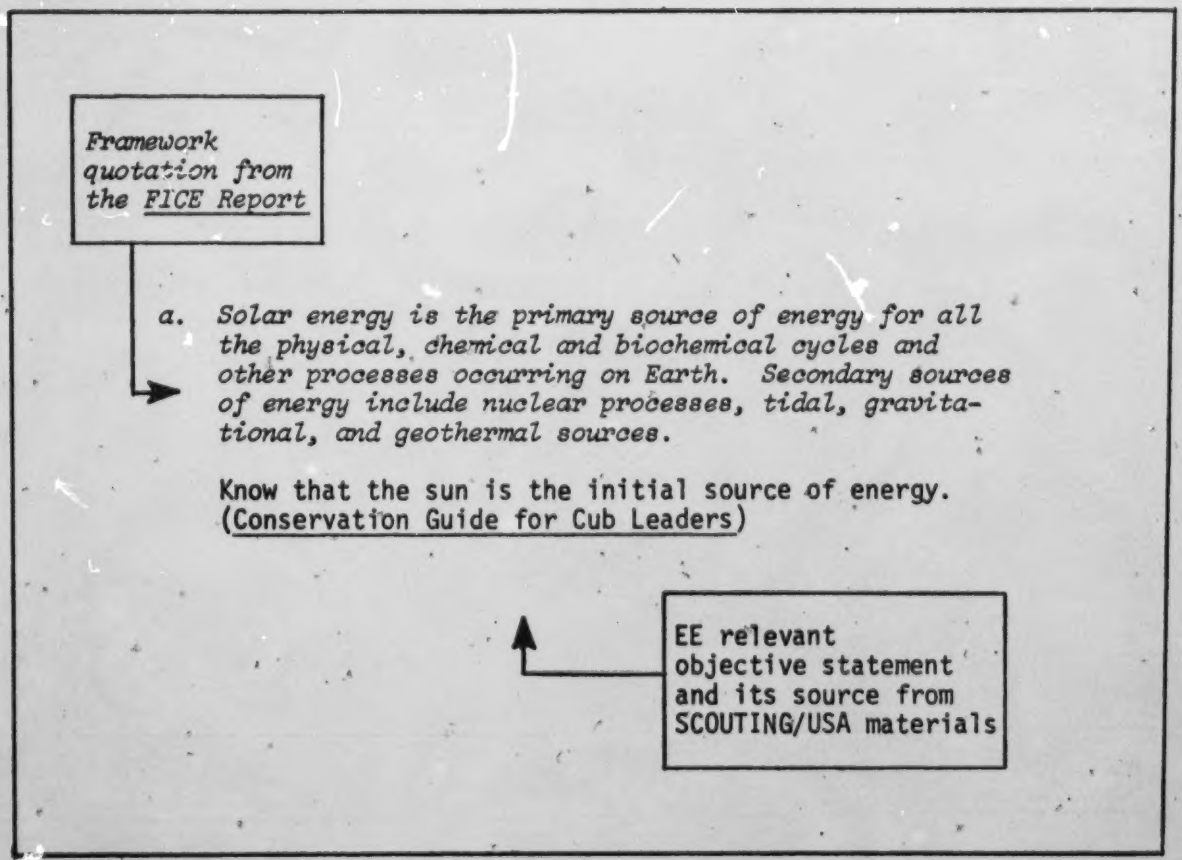
SCOUTING/USA has stressed outdoor activity and nature study since its foundation in this country in 1910. This emphasis was originally valued for its recreational and character-building potential, but has become an acknowledged aspect of the organization's good citizenship program as well.

Because many Scouting activities take place out of doors and many are environmentally oriented, a good deal of environmentally related Scouting literature exists. As a first step in analyzing their EE program, materials indicated by the organization were studied and objectives were extracted. These objectives, while not all-inclusive and perhaps not indicative of the total program as it is actually carried out, do serve to indicate the general intent of Scouting's EE program.

To further analyze this program, the Scouting objectives were placed within the framework provided by the FICE Report. The Report contains the following four sections, which are included here in their entirety:

Section I: Fundamentals about Earth's Environment;
Section II: Fundamentals Concerning Humans as Ecosystem Components;
Section III: Methods for Harmonizing Human Activities with Ecosystem Processes to Achieve Environmental Quality; and,
Section IV: Using Fundamentals of the Environment Given in Sections I and II, and Understanding of the Methods Outline in Section III.

Both the framework statements from the FICE Report and EE relevant objectives from Scouting materials are presented here without additional comment. To clearly show relationship, as well as to differentiate between the two sets of statements, the FICE Report framework quotations are set in *italic* type, while the EE relevant Scout objectives and their literature sources are set in regular type, under the framework quotation. For example:


Framework quotation from the FICE Report
a. *Solar energy is the primary source of energy for all the physical, chemical and biochemical cycles and other processes occurring on Earth. Secondary sources of energy include nuclear processes, tidal, gravitational, and geothermal sources.*
Know that the sun is the initial source of energy. (Conservation Guide for Cub Leaders)
EE relevant objective statement and its source from SCOUTING/USA materials

COMPARISON

PICE REPORT SECTION I: FUNDAMENTALS ABOUT EARTH'S ENVIRONMENT

A. Earth's environment is a whole.
B. The ecosphere is a dynamic, constantly changing macro-system -- a mosaic of ecosystems.
C. The energy and materials necessary for all life are components of each ecosystem.
D. Each ecosystem includes a number of species populations.

* * *

A. Earth's environment is a whole.

1. The natural conditions on Earth that support the development and maintenance of ecosystems are a function of Earth's place in the solar system and the structure of Earth.

a. Solar energy is the primary source of energy for all the physical, chemical and biochemical cycles and other processes occurring on Earth. Secondary sources of energy include nuclear processes, tidal, gravitational, and geothermal sources.

Know that the sun is the initial source of energy. (Conservation Guide for Cub Leaders, p. 3)

b. Earth absorbs energy from the sun and radiates energy into space. It is in a state of overall energy balance.

c. The influx and distribution of solar energy gives rise to the climates that prevail upon Earth. It powers the movement of global air masses, the hydrologic cycle, ocean currents. It provides conditions essential to life on Earth.

List the three elements that determine the weather. (Boy Scout Field Book, p. 503)

Describe how to examine a weather map and other meteorological data. (Ecology Workshop Instructor's Guide, p. 7)

Explain what warm and cold fronts are and how they affect the weather cycle. (Weather Merit Badge, p. 17)

Describe what causes air movement and how air moves on a world-wide basis. (Weather Merit Badge, p. 9)

Know how cycles progress, what climate stages are, and why they vary. (Boy Scout Field Book, p. 341)

Describe how to measure wind. (Environmental Science Merit Badge, p. 31)

Measure wind. (Environmental Science Merit Badge, p. 31)

Know the important elements in the hydrologic cycle, how it works, and what problems are associated with it. (Soil and Water Conservation Merit Badge, p. 70, Environmental poster, Environmental Science Merit Badge, p. 319, Boy Scout Handbook, Weather Merit Badge, p. 13, Ecology sign, Save Our Water Resources pamphlet, p. 3)

Demonstrate the hydrologic cycle with emphasis on "normal" runoff, floods, low water in streams, storm sewer runoff, overuse of ground water supplies (Save Our Water Resources pamphlet, p. 19)

Describe how offshore sand bars are built up and torn down. (Geology Merit Badge, p. 35)

2. *Earth's environment constitutes a complex interrelated, interactive life support system called the "ecosphere".*

B. *The ecosphere is a dynamic, constantly changing macro-system -- a mosaic of ecosystems.*

1. *The ecosphere is composed of interacting systems called ecosystems.*

Know the meaning of ecology. (Environmental Science Merit Badge, p. 5, Ecology sign, Save Our Water Resources slide show)

Know that all strands in the web of nature are interrelated. (Ecology sign, Environmental poster)

a. *An ecosystem is a recognizable, homogeneous unit of the ecosphere and exists at a particular point in space and time. Each ecosystem consists of three groups of components: (1) physical factors (sun's energy, climate, rocks, water, etc.); (2) living organisms, including humans; and (3) interactions among and/or between living and nonliving components (competition, erosion, decomposition, etc.)*

Define an ecosystem -- know its different parts. (Environmental Science Merit Badge, p. 16, SOAR slide show)

Know what part altitude and latitude play in the development of an ecosystem. (Nature Merit Badge, p. 8)

Know how weather affects the environment. (Ecology sign)

Describe how wind can affect a wildlife community. (Nature Merit Badge, p. 21)

Know that the characteristics of any (natural) community are determined by the interrelationships of its living and non-living components. (Ecology Workshop Instructor's Guide, p. 3, Nature Merit Badge, p. 5)

Know what effects small animals and plants have on the soil. (Soil and Water Conservation Activities for Scouts, p. 10)

b. *Each ecosystem has "system" characteristics that derive from the interactions of the system's components and differ from the characteristics of individual components. Therefore, the system functions in ways that cannot be understood by studying only its parts.*

Know your local environment -- the good things and the bad things, and what can be done to improve it. (Fish and Wildlife Management Merit Badge, p. 52, Soil and Water Conservation Activities for Scouts, p. 29)

Recognize that the countryside is a natural community. (Reptile Study Merit Badge, p. 59)

c. *Ecosystem processes are limited by such physiochemical attributes as the availability of energy, materials, space, time, and the inherited characteristics of organisms.*

Explain the nature and function of soil. (Environmental Science Merit Badge, p. 9)

Describe how soil is formed. (Ecology and Conservation poster)

Explain the role lichens play in soil development. (Ecology sign, Soil and Water Conservation Merit Badge, p. 10)

Describe how capillary water moves through soil. (Soil and Water Conservation Activities, p. 10)

Measure the water holding capacity of at least two different soils. (Environmental Science Merit Badge, p. 38)

Tell what effects different soil sizes have; tell how cover affects soil runoff; list the advantages of soils that take in water readily; describe the value of soil in supplying nutrients to plants; describe how slope affects soil runoff; discuss how abrasion and temperature affect soil decomposition. (Soil and Water Conservation Activities, pp. 4-23)

List some natural resources that affect the breakdown of soils. (Soil and Water Conservation Merit Badge, p. 11)

d. *The characteristics of each individual organism depend upon interactions of its genetic composition with its total environment.*

e. *These characteristics fit each population to function in particular roles known as "niches". Populations are interdependent with one another and with their physical environment, impacting upon and being impacted by each other and their environment.*

Know what the Pyramid of Life is, and why it is important. (Soil and Water Conservation Merit Badge, p. 7, Ecology sign)

Discuss the role organic matter plays in soil composition. (Soil and Water Conservation Activities, p. 7)

Discuss how organic material affects soil water holding abil'ty. (Soil and Water Conservation Activities, p. 12)

Describe the importance of phytoplankton in the maintenance of sea life. (Oceanography Merit Badge, p. 25)

Know how plants influence the cycle of nature. (Environmental Science Merit Badge, p. 16)

Describe what part mosses play in the plant growth cycle. (Ecology sign)

Define grasses and describe their importance in the life cycle. (Environmental Science Merit Badge, p. 5, Boy Scout Field Book, pp. 360-362

Describe the role grasses play in protecting the soil. (Ecology sign)

Know the species composition of the forest vegetation and its relationship to the total ecosystem. (Ecology Workshop Instructor's Guide, p. 7, Conservation Education Trail Guide, pp. 5-7)

Know the influence of climate and weather on a forest ecosystem. (Ecology Workshop Instructor's Guide, p. 2)

List some of the value trees are to the environment. (Boy Scout Field Book, p. 372)

Know what a watershed is and why its proper maintenance is important. (Soil and Water Conservation Merit Badge, pp. 50-59, Ecology sign)

Know how insects fit in the web of nature. (Insect Life Merit Badge, p. 59, and Beekeeping, Bird Study, Botany, Cotton Farming, Forestry, Fruit and Nut Growing, Gardening, Nature, Reptile Study, Small Grains, Fish and Wildlife Management and Mammals Merit Badges)

Discuss the different societal structures of insects, and list the identified characteristics of an insect. (Insect Life Merit Badge, pp. 40-51)

Describe how pollinators serve the environment. (Ecology sign)

Explain the role some insects play in pest control. (Ecology sign).

Tell how birds help plant growth. (Soil and Water Conservation Activities, p. 23)

Tell how to identify different birds, where they live, and what they eat by their physical characteristics. (Bird Study Merit Badge, pp. 22-31)

Know how a wildlife community is affected by the web of nature. (Nature Merit Badge, p. 16)

Know the ecological role of animals in a marsh. (Ecology Workshop Instructor's Guide, p. 37)

Know the ecological role of animals in a stream. (Ecology Workshop Instructor's Guide, p. 19)

Know the ecological role of animals in a forest. (Ecology Workshop Instructor's Guide, p. 7)

f. Both ecosystems and species vary in their ecological amplitude, i.e., their parameters and capacities to interact with other components of the ecosystem and with other ecosystems.

Understand that any given environment has limited resources. (Ecology Workshop Instructor's Guide, p. 7)

Know that soil is one of the two major factors in determining the distribution of organisms. (Ecology Workshop Instructor's Guide, p. 1)

Understand how soil affects plant and animal life. (Ecology Workshop Instructor's Guide, pp. 19, 37, 7)

Make a map, show topography, plant, and animal types. (Environmental Science Merit Badge, pp. 23-27)

Analyze sections of stream, marsh, and forest ecosystems. (Ecology Workshop Instructor's Guide, pp. 19, 37, 7)

Know what has affected the fish in lakes and streams. (Fishing Merit Badge, p. 61)

2. The ecosphere and all its ecosystems undergo continuous change.

Know that environments are in a continuous state of change. (Conservation Education Trail Guide, p. 3)

a. Throughout its history, Earth has undergone and continues to undergo extensive changes in environmental factors, such as climate, topography, geologic processes and distribution of oceans and continents.

Know the basic theories about the events that created our earth as it is today. (Boy Scout Field Book, pp. 495-500, Geology Merit Badge, pp. 66-67)

Know how climate affects the environment. (Ecology sign)

Tell why topography is important, and how plants and soils affect it. (Environmental Science Merit Badge, p. 35)

List techniques of mapping. (Environmental Science Merit Badge, pp. 23-27)

Know what Geology is. (Geology Merit Badge, pp. 1-3)

Tell how different rock types were formed. (Geology Merit Badge, pp. 31-39, Boy Scout Field Book, pp. 496-500.

Describe the different processes which form mountains; describe what effects volcanoes have on the earth's surface; tell how mineral fuels are formed. (Geology Merit Badge, pp. 19-22, 28-30, 46-48)

b. *Organisms have changed greatly through small consecutive modifications of their genetic composition, thus adapting to their environment. Such changes continue to occur through time and space. Extinction of species has resulted from failure to adapt to environmental change.*

Know that life evolves. (Ecology sign)

Know that species adapt to changes in their own environments or become extinct. (Ecology Workshop Instructor's Guide, p. 1)

c. *Ecosystems arise as organisms invade formerly lifeless water, or bare mineral substrates (rocks, sand), or as pre-existing ecosystems are modified. New combinations of organisms and environments produce new ecosystems. As ecosystems operate through time, their living and non-living components contribute to, interact with, and change the character of the system. Natural and human processes (fires, landslides, earthquakes, urbanization, etc.), alter ecosystems in varying degrees. Ecosystems have various degrees of resiliency to alteration, giving them varying capacities and rates of recovery from alteration. If a given ecosystem is perturbed enough, by removal of old or addition of new components and change of processes, it can be reduced to near or actual extinction. However, some type of ecosystem subsequently will develop unless the area is rendered toxic to all life for extended periods.*

Know that the manipulation of one factor in an ecosystem may result in unforeseen changes in the entire structure and function of the system. (Ecology Workshop Instructor's Guide, p. 1, Conservation Education Trail Guide, p. 3, Ecology sign, Ecology Workshop p. 3, Cub Scout Conservation Activities Idea Sheet)

Know that organisms change their own environment. (Ecology Workshop Instructor's Guide, p. 1)

Know the effects of introducing a new organism into an environment. (Ecology sign)

Describe an area that has been cleared for a construction project. (Merit Badge Summary list)

Know what things have a negative effect on a forest environment. (Forestry Merit Badge, pp. 40-44)

Know what things affect water as a community. (Nature Merit Badge, pp. 8-11)

Know what Biological Magnification is and why it is important. Environmental poster)

d. *As an ecosystem persists and matures through long periods of time there is a tendency toward an increase in the diversity of organisms. In mature ecosystems, a steady-state character persists, even though individual organisms and species arrive, die, or depart, and even though particular kinds of organisms may not always be present. In general, complex mature ecosystems are more resilient to physical, biological, economic, and social variations than developing systems and are generally more stable.*

Know the basic succession steps. (Exploring Ecology Workshop)

Know the soil to forest succession chain. (Ecology sign)

Know the water to forest succession chain. (Nature Merit Badge, p. 19, Ecology and Conservation poster)

Know the plant succession chain. (Ecology sign)

Know what factors cause plant succession. (Nature Merit Badge, p. 12)

Know what plant succession is and how it affects animal succession. (Fish and Wildlife Management Merit Badge, pp. 37-40)

Know what lake succession is and how it affects wildlife. (Fish and Wildlife Management Merit Badge, pp. 41-43, Ecology sign)

Know what animal succession is. (Nature Merit Badge, p. 16, Fish and Wildlife Management Merit Badge, p. 40)

Know what a climax community is. (Nature Merit Badge, p. 12)

Tell what is meant by an "apartment house" environment. (Ecology sign)

Discuss why a more complex food web is more stable. (Conservation Education Trail Guide, p. 6)

e. *Niches become more specialized as ecosystems mature. Changes in ecosystems interact with changes in organisms, resulting in greater specialization of niches. Some species have expanded their niches by learned behavior. These changes have enabled more types of organisms to live in the ecosystem, thus further changing its character.*

f. *Some characteristics of an ecosystem are influenced strongly by its origin and history.*

Know how climate affects a community's composition. (Conservation Education Trail Guide, p. 6)

Describe the value of an edge effect on animal habitats. (Fish and Wildlife Management Merit Badge, p. 30, Nature Merit Badge, p. 19)

List the elements essential to a fire. (Forestry Merit Badge, p. 45)

Describe the effects wildfires have on forests and what you can do to help prevent them. (Webelos Scout Book, p. 115)

C. *The energy and materials necessary for all life are components of each ecosystem.*

1. *Energy used in all ecosystems comes originally and primarily from the sun; materials come from components of the ecosphere.*

2. *Green plants, through photosynthesis, use the sun's energy to convert water, carbon dioxide, and small amounts of minerals into high-energy organic compounds that power all life processes. This energy is released by the process of respiration in organisms. Both of these processes (photosynthesis and respiration) are limited to fairly narrow ranges of temperature, moisture, and chemical conditions, and by the genetic composition of organisms.*

Know the importance of sunlight in photosynthesis and evaporation. (Environmental Science Merit Badge, pp. 5-6, Ecology sign)

Describe the role of soil as the source of mineral nutrients for plants. (Conservation Education Trail Guide, p. 4)

Tell why plant nutrients are important. (Soil and Water Conservation Merit Badge, pp. 22-30.

Know how climate affects plant growth. (Nature Merit Badge, p. 8)

List the purposes of the different parts of a tree. (Forestry Merit Badge, pp. 14-17)

Describe how water and minerals help a tree grow. (Webelos Scout Book, p. 111, Soil and Water Conservation Merit Badge, p. 25)

Describe how plants make food. (Ecology and Conservation poster)

3. *Materials are cycled and recycled via foodwebs through plants to herbivores to fewer carnivores, etc. Ultimately they are reduced by many decay organisms to inorganic forms, completing the cycle, as materials are reused. Examples are the nitrogen and carbon cycles.*

Know the meaning of cycles. (Environmental Science Merit Badge, pp. 11-15, Boy Scout Handbook, p. 308)

Describe the important elements of food chains. (Environmental Science Merit Badge, p. 13)

Describe the important elements of the nitrogen cycle. (Environmental Science Merit Badge, p. 12)

Know that the soil is self-renewing. (Ecology sign)

Understand how the land food chain recycles itself. (Boy Scout Handbook, p. 276)

Know the importance of soil in the web of nature. (Environmental Science Merit Badge, p. 9)

Know the importance of plants, water, and animals in the web of nature. (Environmental Science Merit Badge, pp. 10-16)

Know the aquatic, terrestrial, and animal food chains. (Ecology and Conservation posters)

Understand how the aquatic food chain recycles itself. (Oceanography Merit Badge, pp. 22-25)

Know what the food chain for birds is and how birds fit into it. (Bird Study Merit Badge, p. 55)

Know the forest food chain. (Ecology sign)

Tell how some chemicals get into the tissues of animals miles from where they were used. (Environmental Science Merit Badge, p. 45)

List the values of natural litter, describe the decaying process of a tree, and list the values to the environment of a brush pile. (Ecology signs)

4. *Some energy moves through the physical and chemical components of ecosystems; the rest flows through foodwebs. No energy conversion is 100 percent efficient, so energy is constantly dissipated from the system. This dissipation of energy results in a deficit. A constant infusion of additional energy is required for organisms and ecosystems to live and to grow. The sun provides this energy. Some energy is stored in organic materials that can be used in the future.*

5. *Most natural ecosystems are adapted to operate on the energy and materials directly available to them. These resources are renewable by recycling; in natural ecosystems, the rates of consumption and renewal are balanced. While primitive human social groups are similarly adapted, modern man-made systems require heavy subsidization of energy and materials.*

Know that the basic processes are renewable. (Ecology Workshop, p. 3, Cub Scout Conservation Activities Idea Sheet)

Know that some resources are renewable and some are not. (Conservation Education Trail Guide, p. 3)

Plant and tend your own "Energy Garden". (Project SOAR, '75-6)

D. *Each ecosystem includes a number of species populations, the size and stability of which vary, depending on biotic and abiotic changes in the system.*

Know the basic needs of animals. (Mammals Merit Badge, p. 13, Ecology sign, Ecology and Conservation poster)

List the four basic needs of birds -- living space, food, cover, and water. (Bird Study Merit Badge, p. 28)

Describe the environment needed for a reptile or amphibian to survive. (Reptile Study Merit Badge, p. 50)

1. *When a population is introduced into an ecosystem to which it is adapted, the excess of births over deaths results in a typically S-shaped pattern of growth. Growth levels off as birth and death rates equalize; decline occurs as death rate exceeds birth rate.*

Tell how the pyramid of numbers affects the food chain. (Ecology sign, Mammals Merit Badge, p. 41, Fish and Wildlife Management Merit Badge, p. 27)

Understand the effects of overpopulation on the land. (Environmental Science Merit Badge, p. 49)

Recognize the need for population control. (Environmental Science Merit Badge, p. 50)

2. *Birth rate and death rate are influenced by factors intrinsic and extrinsic to the population (limiting factors). Intrinsic factors are genetic (reproductive capacity, innate behavior, food requirements, resilience, etc.). Extrinsic factors are environmental. They include chemical factors (nutrients, toxins, etc.) and physical factors (temperature, humidity, etc.) as well as factors related to interactions with its own and other populations (competition, predation, parasitism, etc.) Density of a population affects all of these extrinsic relationships.*

Tell what affects tree reproduction. (Ecology poster)

Tell what elements affect where fish migrate. (Fishing Merit Badge, p. 7)

Describe the part predators play in the life cycle, and tell how nature helps to control pests. (Ecology posters)

a. *For modern humans, birth rate is affected primarily by socio-cultural means (e.g., delay in marriage, contraception, abortion, etc.); death rate during infancy, childhood, and even adulthood is affected by technology (e.g., medical science, sanitation, dietary improvement, etc.). While both have changed in recent times, the net result has been a substantial increase in size and growth rate of the world's human population.*

3. *The size of a population in an ecosystem will vary from time to time with changes in physio-chemical factors and with biological interactions, thus defining the "carrying capacity" of the ecosystem for that population under a given set of conditions. To a degree, an ecosystem's carrying capacity can be increased by technology, but only within finite limits.*

Describe what carrying capacity is and why it is important. (Cub Scout Conservation Activities Idea Sheet, Ecology Poster, Environmental Science Merit Badge, pp. 18-22.

List the basic elements which determine the carrying capacity of an area. (Boy Scout Field Book, p. 342, Mammals Merit Badge, p. 23)

List the elements that determine the carrying capacity of a body of water. (Ecology sign)

Build a bird sanctuary of a tenth of an acre or more by planting trees and shrubs for food and cover. (Bird Study Merit Badge, pp. 42-43)

4. *Spatial arrangements of individuals in populations are as important in ecosystem functioning as total numbers of individuals in the population.*

Report on what happens to seedlings when they are badly crowded. (Merit Badge Requirement list)

5. *Ecological amplitude, environmental barriers to dispersal, and history control distribution of populations.*

Tell how many trees will sprout from stumps. (Soil and Water Conservation Activities, p. 26)

FICE REPORT SECTION II: FUNDAMENTALS CONCERNING HUMANS AS ECOSYSTEM COMPONENTS

A. Humans make use of ecosystems to satisfy basic needs and desires.
B. Humans affect ecosystems.
C. Ecosystems affect humans.
D. Complex interactions among humans and other ecosystem components occur continuously.
E. Humans are accountable for their effects on ecosystems.

* * *

Organisms influence the characteristics of ecosystems and are, in turn, strongly influenced by the characteristics of the ecosystems in which they live. Humans are now the most influential of the Earth's organisms and influence all of Earth's ecosystems.

A. Humans use ecosystems to satisfy basic needs and desires:

1. The basic biological needs that must be met for humans to live and to grow and for the species to survive:

a. Habitable climate -- temperature range, moisture, etc.

b. Energy and materials -- food, air, water, organic chemicals, etc.

Know the importance of resources. (Conservation Guide for Cub Leaders, Idea Sheet)

Know the importance of clean air to man. (Ecology sign)

Know the importance of water to man. (Ecology sign)

Describe how man uses water. (Soil and Water Conservation Merit Badge, pp. 73-86.

Recognize the importance of helping to maintain clean water (Ecology sign)

Know what water supply problems can affect you locally. (SOAR)

Have a water resources camporee with activities centered around the use of water for swimming, boating, fishing; displays, and projects. (SOAR)

Know why rocks and minerals are important to man. (Ecology sign, Webelos scout book, p. 122)

Appreciate the importance of soil in your life. (Soil and Water Conservation Merit Badge, p. 31)

List the uses of 15 different trees. (Forestry Merit Badge, p. 6)

List some of the products forests provide. (Forestry Merit Badge, p. 17)

Indicate the chief crop production regions in the U.S. (Merit Badge Requirement list)

Explain the importance of marine food in man's present and future environment. (Fish and Wildlife Management Merit Badge, pp. 48-49)

c. *Rest and exercise.*

d. *Other humans for reproduction.*

e. *Protection against environmental stresses -- sun, wind, rain, disease, etc.*

2. *Among humans, essential psychological and social needs and desires requiring fulfillment include security, love, esteem, self-fulfillment, social interaction, health, comfort, material goods, religious experiences. Humans cannot grow and completely develop mentally unless these needs are met.*

3. *Human cultures each have their own perceived needs and desires that make different demands and impacts on ecosystems. In time of stress, many of these needs and desires can be adjusted.*

a. *Universal human desires for more and more material goods are expressed differently in different cultures. As the satisfaction of these desires increases, human impact on ecosystems increases.*

b. *Value systems play a highly significant role in determining the kind and extent of a society's impact on ecosystems.*

c. *Increasing the consumption of energy and materials often leads to deleterious impacts on ecosystems.*

Know that man drains the environment by his present lifestyle. (SOAR outline, '71)

(1) *Increased CO_2 and heat in atmosphere, e.g., heat islands over cities.*

Tell how climate affects you and what you can do to affect it. (Weather Merit Badge, p. 58)

(2) *Albedo changes.*

(3) *Introduction of new synthetic substances that produce an effect that is an order of magnitude different (and often adverse) on living systems, e.g., chemicals that are toxic, mutagenic, carcinogenic, either chronic or acute.*

Know what air pollution is. (SOAR, '71, Environmental poster, Environmental Science Merit Badge, p. 45)

Know what water pollution is. (SOAR, '71, Environmental Science Merit Badge, p. 45, Environmental poster)

Know the effects of pollution on water processes. (SOAR, '75-76)

List some causes and effects of air pollution. (SOAR, '71, Environmental Science Merit Badge, p. 45)

d. *Concentration of humans, especially in built environments, intensifies the deleterious effects of humans on ecosystems.*

e. *Among culturally-specific perceived needs are:*

(1) *Preservation of land, ecosystems, and species, together with conservation of materials and energy.*

Carry out projects to reduce the consumption of energy in America. (SOAR, '75-76)

Recognize the need for limiting the consumption of energy. (SOAR, '75-76, Scouting Environment Day objective, '76)

(2) *Satisfaction of desires for status and for exotic materials and experiences.*

(3) *Economies of scale concentrating human activities that result in major changes in ecosystems.*

(4) *Planned obsolescence of manufactured goods.*

(5) *Dietary customs, family size, work attitudes.*

B. *Humans affect ecosystems, as an all-pervasive species in the ecosphere that has a special type of ecological dominance, exerting major kinds of influences on ecosystems.*

Understand that man affects the environment. (Conservation chart, Environmental poster, Conservation Guide for Cub Leaders, Idea Sheet, Conservation Education Trail Guide, p. 3, Citizenship Through Service, p. 12)

1. *Human domination results from:*

   a. *Intellectual capacities that permit the development of:*

      (1) *Technology that gives unique control over energy flows, food and goods production, disease, and other factors that would otherwise limit human populations.*

      Write a report explaining how energy in fuel is changed to useful work in a machine. (Merit Badge Requirements list)

      Describe how man uses his resources to make paper and paper products. (Merit Badge Requirements list)

      Tell what sewage treatment processes have been developed to treat water. (Soil and Water Conservation Merit Badge, pp. 82-86)

      Tell why water purification is so expensive. (Citizenship in the Community Merit Badge, p. 43)

      Describe how to desalt water, and why it is important. (Soil and Water Conservation Merit Badge, p. 59)

      (2) *Unique institutional and technological control over other populations in ecosystems; e.g., domestication of some species -- pigs, dogs, cows; suppression of "undesirable species" -- rats, mosquitoes, dandelions, etc.; and encouragement of "desirable species" -- Kentucky bluegrass, shade trees, pheasants, deer, etc.*

      Know how man affects plant growth. (Merit Badge Requirements List)

      Tell how fertilizer helps plant growth. (Soil and Water Conservation Activities for Scouts, p. 22)

   b. *Biological and cultural adaptation to a wide range of environmental conditions, which greatly increases effects of humans on ecosystems ranging from improvement to destruction.*

      Tell why man is becoming more dependent on the ocean. (Oceanography Merit Badge, p. 5)

      Recognize that a change in our basic way of life is inevitable. (Scouting Environment Day objective)

      (1) *The built environment on a metropolitan scale constitutes a major change in kinds of human settlements.*

   c. *Sheer population size.*

   d. *Great specialization and diversity in the division of labor.*

2. *Human tendencies to form and function in social and corporate groups and institutions promotes development of human habitats that currently create unique concentrated demands on ecosystems and further increase human effects on ecosystems.*

   a. *These effects are augmented by concentration of humans into small areas, such as metropolises.*

      Recognize the importance of keeping the environment free of manmade litter. (Ecology sign)

   b. *Human settlements on a metropolitan scale have effects on ecosystems that rival those of mountains, glaciers, droughts, and floods.*

3. *Burgeoning human populations and technological capabilities are of relatively recent origin. This increasingly rapid growth and development has brought to ecosystems increasingly rapid changes, some of which are potentially irreversible.*

   Know how man found his American resources and altered them (SOAR -- Our American Heritage)

4. *Human aesthetic, ethical, moral, and spiritual values reinforce and/or conflict with harmonious relationships within ecosystems.*

   Recognize that development of new sources of energy must be compatible with a quality environment. (SOAR, '75-76)

   Recognize the value of living with nature instead of trying to change it. (Boy Scout Field Book, p. 335)

   Recognize the value of man in balance in a peaceful world. (Ecology sign)

   Clean up a section of a lake or stream by removing unsightly rubbish. (SOAR -- Save Our Water Resources)

C. *Ecosystems affect humans, as the arenas in which all human perception and activity take place.*

   1. *Humans and all their products function in an ecosystem framework.*

      Know why man is dependent on the web of nature. (Boy Scout Handbook, pp. 313-316, Ecology Workshop, p. 3)

      a. *The built environment radically transforms human society and culture -- as space, as function, as sensory stimulus, as motivation, as support, as hazard.*

      b. *Past ecosystem processes and events have produced major biological and cultural differences in human populations.*

2. *Changes in the ecosphere due to increasing human numbers and technology have short and long-term effects, e.g.,*

   a. *Short-term effects on:*

      (1) *Birth and death rates*

      (2) *Biological fitness of human populations as measured by growth rates, disease patterns, nutritional levels, aging, etc.*

      (3) *Use of non-renewable materials and stored energy sources.*

      Recognize recycling as an important way to improve the environment. (SOAR '75-76)

      Understand the value of recycling, and know what you can do to help recycle resources. (SOAR, '75-76)

      Know why recycling paper is valuable. (Scout Council Paper Recycling Kit)

      Assume the responsibility to recycle paper, glass, and aluminum and encourage others to do the same. (SOAR, '75-76)

      Recognize that the world cannot afford to waste fossil fuels. (SOAR fact sheet)

      (4) *Functional capacities of individuals and populations -- mental productivity, attitude, etc.*

      (5) *Renewable resources.*

   b. *Long-term effects on:*

      (1) *Genes and chromosomes and their evolutionary consequences.*

      (2) *Selection pressures -- elimination of some and/or introduction of others.*

      (3) *Ecosystem changes resulting from evolution of their component populations.*

      (4) *Health and life cycles.*

      (5) *Global climate.*

      (6) *Reserves of non-renewable and renewable resources.*

      (7) *Culture.*

3. *Although several species exhibit non-genetic information transfer, the built environment and the psychological milieu have a powerful effect on humans because information transfer by verbal and learned behavior is such a large part of the contemporary human environment. They operate on humans in a parallel and synergistic manner in much the same way as do physical and chemical components of ecosystems.*

D. *Complex interactions among humans and other ecosystem components occur continuously.*

1. *Humans' perceptions of their needs, their impacts on ecosystems, and ecosystem impacts on them reflect the cultural and individual values, goals, skills, insights, and capabilities of the individuals, groups, institutions, and nations involved.*

Recognize the importance and value of American energy independence. (SOAR, '75-76)

Organize and run a neighborhood campaign to clean up places that harbor rats or other harmful wildlife. (Fish and Wildlife Management Merit Badge, p. 59)

Recognize that you must help to keep nature in good working order. (Ecology sign)

2. *Relationships among components of ecosystems are reciprocal, ranging from mutually beneficial to unidirectionally destructive.*

Discuss the problems that animals can cause man. (Fish and Wildlife Management Merit Badge, pp. 17-19)

Know how man affects the wildlife community. (Nature Merit Badge, pp. 21-24, Conservation Chart)

Describe how insects help man. (Insect Life Merit Badge, pp. 52-54)

Carry out a project that will improve a land area for fish and wildlife. (Fish and Wildlife Management Merit Badge, p. 59)

Tell how contouring affects soil runoff. (Soil and Water Conservation Activities for Scouts, p. 16)

Prevent and stop stream bank erosion by planting the banks with grasses, legumes, shrubs, or trees, where applicable and recommended. (SOAR '75-76)

Under supervision, construct structures such as deflector dams, V-dams, or other devices to improve the stream as a fisheries resource or to control flow. (SOAR '75-76)

Where a stream is actively undercutting and causing bank erosion, rip-rap the stream bank with rock or logs. (SOAR)

Cooperate in a watershed study and improvement project. (SOAR)

Rip-rap dam spillways and ends of dams to prevent erosion. (SOAR)

Test acidity of a stream or pond with an inexpensive water pH kit. Find out what a normal pH reading should be for that water. Show the relationship of water acidity to kinds of fish or lack of fish and other animals. (SOAR)

By sampling a stream after a rain, determine the amount of soil loss over a period of time in that particular watershed. (SOAR -- Save Our Water Resources)

Know what controls man has developed to help ease the problems of soil erosion. (Soil and Water Conservation Merit Badge, pp. 42-49)

Understand watershed management concepts. (SOAR -- Save Our Water Resources)

Know what can be done to improve range management. (Forestry Merit Badge, pp. 38-39)

Know what man has done to help improve the quality of soil. (Soil and Water Conservation Merit Badge, pp. 26-30)

3. *A governing relationship among and within components of ecosystems is a feedback mechanism (physical, chemical, social, behavioral), ranging from highly sophisticated to rudimentary.*

4. *Human activities often have synergistic effects on ecosystems and vice versa.*

5. *Human activities present both solutions and problems for ecosystem maintenance and management.*

   a. *Potentially positive activities of humans within ecosystems -- some evidences are:*

      (1) *Domestication and husbandry of plants and animals.*

      (2) *Reduction of disease and mortality.*

      Understand what conservation means. (Soil and Water Conservation Merit Badge, p. 42)

      Know the basic principles of soil, water, wildlife, plant, and fish conservation. (Boy Scout Field Book, pp. 481-493)

      List some of the wildlife management techniques man has used to control hunting, fishing, and pest control. (Environmental poster, Fish and Wildlife Management Merit Badge, p. 10-24)

List some of the conservation practices that help reptiles and amphibians survive. (Reptile Study Merit Badge, p. 60)

Keep a reptile or amphibian for at least a month. (Reptile Study Merit Badge, p. 45)

Know what man does to protect the forests. (Forestry Merit Badge, pp. 25-49, Environmental poster)

Accept the responsibility for fire safety. (Ecology sign)

(3) Constructed and controlled space for living, working, manufacture, storage, recreation, transportation, etc.

Recognize the importance of open space in land use planning. (Environmental poster)

(4) Preservation of genetic stocks of non-domesticated organisms and preservation of specific ecosystems.

Carry out a project that will influence the numbers of one or more mammals. (Mammals Merit Badge, p. 44)

Plant 100 trees, bushes, or vines for a good conservation purpose. (Soil and Water Conservation Merit Badge, p. 87)

Seed 1/5 of an acre for a good conservation purpose. (Soil and Water Conservation Merit Badge, p. 87)

List some of the land use practices that man has used to affect wildlife. (Fish and Wildlife Management Merit Badge, pp. 8-10, 21-24)

Describe something that can be done to help improve the forest harvest. (Forestry Merit Badge, pp. 38-39)

Carry out a project for the improvement of a forest area. (Forestry Merit Badge, p. 26)

(5) Perception and appreciation of ecosystems and their components.

(6) Development of human law and property rights.

(7) Reduced human populations under certain social-cultural conditions.

(8) Elaboration of functional roles (i.e., niches) for humans, which increases diversity of ecosystems.

b. Potentially destructive activities of humans within ecosystems -- some evidences are:

(1) *Discrete large scale events that warn of imbalances between human activities and ecosystem functioning (e.g., changes in atmosphere, marine oil slicks, dustbowls, floods, etc.).*

Know the causes and effects of soil erosion. (Soil and Water Conservation Merit Badge, pp. 31-40; Geology Merit Badge, pp. 6-22)

Describe the effects of splash erosion. (Soil and Water Conservation Activities for Scouts, p. 18, Soil and Water Conservation Merit Badge, p. 36)

(2) *Decreasing numbers of individuals, declining continuity and area of ecosystem-type, and reduced average species diversity for given ecosystem type (e.g., decline of predatory birds and mammals, of tall grass prairies, etc.)*

List some factors that have caused the extinction and decline of species of birds in recent years. (Bird Study Merit Badge, pp. 64-67)

Know how pesticides have affected the environment. (Ecology sign, Environmental poster)

Tell what land pollution does to the environment, and what water pollution does to lakes and rivers. (Environmental Science Merit Badge, p. 45)

(3) *Increases in environmentally-induced human health problems (e.g., pollution-induced disease, noise-induced deafness, etc.)*

Know the causes, effects and possible solution to water pollution. (Soil and Water Conservation Activities for Scouts, p. 15, Environmental poster)

Describe the health dangers from air and water pollution. (Merit Badge Requirements list)

(4) *Destruction/modification of habitats, creation and concentration of pollutants, and other inadvertent or deliberate acts.*

Be aware of how man pollutes soil, water, and air. (Environmental Science Merit Badge, p. 36, Conservation Chart)

Be aware of the problems of chemical pollution. (Environmental Science Merit Badge, p. 51)

Recognize the importance of preventing forest fires. (Forestry Merit Badge, p. 49)

(5) *High rates of energy dissipation and production of pollutants in heavily urban areas.*

Visit the public agency in your community responsible for sewage treatment. (SOAR -- Save Our Water Resources)

Tell what sort of sewer systems your area has. Tell if it has separate storm and sanitary sewers. (SOAR -- Save Our Water Resources)

(6) *Depletion of relatively concentrated sources of raw materials.*

Understand that fossil fuels are running out. (SOAR -- Mobilize for Energy Conservation)

E. *Human ability to comprehend both the basic concepts about ecosystem processes, and the consequences of human actions in relation to ecosystem processes, short- and long-term, must be coupled with their ability to control their actions, in order to produce an ethic of accountability for human impacts on ecosystems. The preservation of civilizations as we know them depends on the exercise of an ethic of accountability for human impacts on ecosystems, balanced by the realization that humans require modification of the natural environment (housing, vehicles, agriculture, extension of communication -- e.g. books, radios, TV, etc.) which, even if primitive and crude, allows humans in small groups to extend culture beyond the mere survival level.*

Learn to appreciate our natural resources. (SOAR -- Save Our Water Resources)

Have reverence for earth and its resources. (Ecology Workshop Instructor's Guide)

Know the basis for the "spaceship earth" approach. (Ecology Workshop, p. 3)

Recognize that you must be concerned about anything that damages the environment. (Boy Scout Handbook, p. 313)

Accept your responsibility in maintaining the environment. (Soil and Water Conservation Merit Badge, p. 6)

Accept responsibility for helping to improve your environment. (SOAR -- Our American Heritage)

Recognize the need to actively advocate and practice concern for the environment. (Ecology Workshop Instructor's Guide, p. 62)

Accept the outdoor code -- Clean in Outdoor Manner, Careful with Fire, Considerate in the Outdoors, and Conservation-minded. (Boy Scout Handbook, p. 62)

PICE REPORT SECTION III: METHODS FOR HARMONIZING HUMAN ACTIVITIES WITH ECOSYSTEM PROCESSES TO ACHIEVE ENVIRONMENTAL QUALITY

A. Different kinds of methods.
B. Institutions, processes, and attitudes for implementation.
C. One basic process for harmonizing human activities with ecosystem processes.
D. Formal policy and law.

* * *

Using the fundamentals of environment outlined in Sections I and II, this section focuses on ways to implement positive actions for harmonizing human activities with ecosystem processes. This section is especially applicable in the United States, but has relevance elsewhere in the world.

A. The methods by which human activities, local through global, are harmonized with ecological processes, are complex, and outcomes are not always predictable. Effects of ecosystem changes on human biology and culture are inevitable, ever present, and of limited susceptibility to management. Detailed knowledge needed to make environmental predictions often is incomplete or unavailable. There are no uniformly dependable social-political processes for responsible decision-making. The ways that societies pursue harmonization include:

1. Education of the public, formal and nonformal.

2. Appreciation and practice of various art forms in sensitizing humans to different types and facets of environmental quality.

3. Encouragement of corrective actions by individuals, businesses, government agencies, etc.

Recognize the need to control Environmental Polluters. (Environmental Science Merit Badge, p. 51)

Know what roles man plays through government agencies in conservation. (Fish and Wildlife Management Merit Badge, pp. 33-35)

4. Voluntary adoption and implementation of policies and standards.

Check your home for water loss and take corrective measures. (SOAR -- Save Our Water Resources)

Determine how much water your family uses each day, month, year. (SOAR)

Accept your part in conserving energy in your home. (Environmental poster)

Recognize your responsibility to intelligently use and properly care for resources. (Ecology Workshop)

Recognize the need to determine the best use for all resources. (SOAR)

Commit yourself to improving your local environment. (Environmental Science, pp. 54-57, Ecology sign, SOAR -- Our American Heritage)

5. *Establishment of formal policies, guidelines, and standards.*

   List some of the controls being placed on polluters. (Environmental Science Merit Badge, p. 51, Ecology sign)

6. *Use of economic and social incentives.*

7. *Enforcement of policies, guidelines, and standards.*

B. *Institutions, processes, and attitudes for implementing investigative, preventive, remedial, and creative actions that will harmonize human activities with ecosystem processes are:*

1. *Education and communication.*

2. *Religious, aesthetic, ethical, and moral influences.*

3. *Science and technology.*

4. *Civic and social institutions.*

   Recognize the importance of good community planning. (Environmental poster)

   Recognize that the appearance and cleanliness of the community depends on everyone's participation. (Citizenship Through Service projects)

   Recognize the importance of working with others to solve water management problems. (Soil and Water Conservation Merit Badge, pp. 52-56)

   Describe what you and others can do to help solve a local air pollution, water pollution, or litter problem. (Environmental Science Merit Badge, p. 5

5. *Governmental and political processes.*

6. *Industry and commerce.*

C. *One basic process for harmonizing human activities with ecosystem processes involves adjusting perceived imbalances, identifying and addressing problems, and utilizing opportunities through institutions and individuals.*

1. *Investigating ecosystem processes and components, including results of human activities on ecosystems and the influences of ecosystems on human beings.*

   Know the basic scientific method of investigation. (Ecology Workshop Instructor's Guide, p. 1)

   Recognize the value of preplanning to avoid environmental problems. (Environmental Science Merit Badge, p. 48)

2. *Recognizing the importance of ecosystem processes and significance of ecosystem changes.*

3. *Identifying causes of ecosystem changes and their consequences.*

4. *Arraying alternative action strategies that would maintain and enhance beneficial ecosystem changes and would stop or reduce detrimental changes, with special attention to irreversible/irretrievable changes, and to long-range vs. short-range commitments of resources.*

   Know the long-term alternatives to oil and their advantages and disadvantages. (SOAR -- Mobilize for Energy Conservation)

5. *Analyzing and evaluating alternatives within a broad array of environmental, social, and economic criteria, recognizing that criteria and values will differ according to the circumstances of politics, geographic location, scale, time, and society (war, good times, flood, famine, etc.).*

   Strive to be aware of the problems and solutions for the energy shortage. (SOAR -- Mobilize for Energy Conservation)

   Analyze your neighborhood and write down good and bad points about it. (Boy Scout Handbook, p. 318)

6. *Selecting among alternatives and adopting a policy. (This occurs at individual through global levels, consciously and unconsciously.)*

7. *Choosing and implementing actions to carry out policy.*

   Know the importance of good community planning. (Citizenship in the Community Merit Badge, p. 44, Environmental poster)

   Carry out projects to reduce energy consumption. (SOAR -- Mobilize for Energy Conservation)

   Participate in recycling projects. (SOAR)

   Carry out a project to improve your neighborhood. (Boy Scout Handbook, p. 318)

   Carry out a project in ragweed control, litter prevention, recycling, or erosion control. (Boy Scout Handbook, pp. 320-321)

8. Monitoring and evaluating effects of implemented policies and actions.

9. Feeding information from step #8 back through step #1, etc., to keep actions adjusted to changing data bases, requirements, conditions, and perceptions.

D. Increasing scientific knowledge of ecosystem processes in the United States and the world, coupled with increasing citizen awareness of ecosystem disfunctions and acute environmental problems, led to establishment of policies and enactment of environmental legislation in the 1960's, which were augmented and adjusted in the 1970's.

Know what legislative action has been taken to protect the environment. (Fish and Wildlife Management Merit Badge, pp. 8-10)

(The remainder of this section consists of a complete listing of environmental and conservation legislation from 1969 through 1976.)

FICE REPORT SECTION IV: *USING FUNDAMENTALS OF THE ENVIRONMENT GIVEN IN SECTIONS I AND II, AND UNDERSTANDING OF THE METHODS OUTLINED IN SECTION III*

Some of the questions that must be addressed, and some of the issues that must be resolved are:

A. Questions:

1. *What are the minimum per capita requirements for a quality human experience throughout life?*
2. *What energy resources are needed to meet these minimum per capita requirements throughout a human life span?*
3. *What is the food production capacity of Earth with known technologies?*
4. *What natural and man-made material resources are needed to meet these minimum per capita requirements throughout a human life span?*

B. Issues:

1. *Land suitability planning*
2. *Strip mine land reclamation*
3. *Protection of ecosystem processes affecting food production*

CONCLUSION

Costs of insults to organismic systems and to ecosystems are paid by all in reduced health, as well as lowered organic and work productivity. The most equitable way to pay these costs must be worked out by the time honored democratic processes. A sound economy and a clean, healthy environment became reciprocally reinforcing by application of human ingenuity and restraint.

SECTION II

ANALYSIS AND RECOMMENDATIONS

An examination of the fundamentals of environmental education from the FICE Report as compared with the learner objectives from SCOUTING/USA materials reveals considerable content overlap. However, this overlap is not necessarily indicative of the degree to which a specific Scout is likely to achieve environmental education goals. The difference between general environmental education goals and those of SCOUTING/USA can be considered from several points of view: the purpose of the EE program; the kind of EE program an individual Scout may receive; the coverage of the total EE program; and recommendations for further development.

A. PURPOSE OF THE ENVIRONMENTAL EDUCATION PROGRAM

The Office of Environmental Education, in Guidelines to the Federal Environmental Education Act published in the Federal Register, offers two "working definitions" of environmental education "that, taken together, reflect the consensus established among educators, ecologists, environmentalists, and other citizens concerning the basic aspects of environmental education."[1]

[1] Federal Register, DHEW, Vol. 39, No. 21, January 30, 1974, Part 2, Sec. 2.2 and 2.3.

> Environmental education is the process that fosters greater understanding of society's environmental problems and also the processes of environmental problem-solving and decision-making.
>
> One of the most important concepts in environmental education is the definition of "environment". Clearly environment can no longer be assumed to imply only endangered species and walks in the wilderness; it includes these but is something far more encompassing.

Environmental education programs designed to implement these definitions will:

- utilize appropriate multidisciplinary or interdisciplinary content and approaches in a highly integrative manner;
- encourage and assist participants in identifying alternative solutions to environmental problems;
- emphasize an ability to understand interrelationships within and among various environmental entities, subsystems, and systems;
- be concerned with long-term as well as immediate environmental improvements;
- utilize content that is technically accurate and valid for environmental education.

It is the perception of those who framed and implemented the Act that environmental education embraces directly or indirectly many of the critical, practical, philosophical and political concerns of the nation.[2] It helps the individual develop the motivation, knowledge, and decision-making and problem-solving skills necessary for responsible participation in the planning and management of our society.

Environmental education and SCOUTING/USA share the aim of developing responsible citizens. Goals stated in the Scoutmaster's Handbook[3] include:

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[2]Bogan, Walter, What Is Environmental Education? The Implementation of the Environmental Education Act of 1970 (P. L. 91-516) as amended by P. L. 93-278, a status report.

[3]Scoutmaster's Handbook, pp. 26-34.

Character Development

1. The Scout is confident in himself but not conceited.
2. He can take care of himself in emergencies.
3. He shows imagination and resourcefulness in solving problems.
4. He is courageous in hard situations.
5. He can plan and use logic to meet unfamiliar situations.

Citizenship Training

1. The Scout understands and can use skills of leadership to lead a group to a successful outcome.
2. He demonstrates concern for and interest in others.
3. He is aware of community organizations and what they do.
4. He contributes in some way to the improvement of the environment in which he lives.

Fitness Training

Physical:

1. The Scout knows and practices good health rules; he has good health habits.

Mental:

1. He is alert.
2. He is able to give and receive information.
3. He retains and uses knowledge.
4. He uses good judgment, thinks logically, and makes sound decisions.
5. He solves problems creatively.

Moral:

1. He has compassion for others' feelings and needs.

Emotional:

1. He can adjust or adapt to new or changing situations.
2. He has self-discipline and self-control.
3. He is constructive and enthusiastic.
4. He respects himself.

Certainly the achievement of any of these goals could contribute to an individual's ability to make responsible decisions concerning the environment. Nevertheless, only the fourth citizenship goal, "He contributes in some way to the improvement of the environment in which he lives," is explicitly concerned with environmental education.

The major difference between the purposes of SCOUTING/USA and those of environmental education is one of emphasis. Whereas environmental education focuses primarily upon environmental concerns and may encourage good citizenship as a secondary result, Scouting holds each Scout's personal development to be of primary importance. In Scouting, it is assumed that a well-rounded individual will be a good citizen and will show concern for the environment.

B. SCOUTING ENVIRONMENTAL EDUCATION COVERAGE

One of Scouting's strengths is flexibility. The program adapts to the resources of a given community and to the needs of individual Scouts. Once a boy has acquired basic Scouting knowledge and skills, he is free to develop his interests and abilities in whatever areas he chooses via the electives, the merit badge program, and special projects. In regard to environmental education, this approach means that only the content included in the basic program requirements is certain to reach all Scouts.

To get a clearer picture of how much environmental education a Scout at any given level of advancement may be involved in, it is necessary to examine the requirements for each rank. The relevant requirements are summarized in Figure 1.

Examination of this summary indicates that a Scout who fulfills basic requirements only will receive rather superficial exposure to environmental phenomena. Neither background nor overview information is provided in scout books or leaders' manuals. In these materials, people are described as being able to affect nature, but human beings are not presented as a link in the environmental chain. There is little explanation of relationships within the

Figure 1. SUMMARY OF ENVIRONMENTALLY-RELEVANT REQUIREMENTS FOR SCOUT RANKS

Rank/Award	Requirements	Reference
	CUB SCOUT PROGRAM	
Wolf Badge		Wolf Book
Conservation Achievement 1 (required)	Learn that: raw materials come from the earth, food comes from the soil, air and water can be polluted, man should beautify environment, conserve water	p. 56
Arrow Point Electives (optional)		
#13 Birds	Identify, provide food and nesting material	p. 142
#15 Gardening	Grow plants in various ways	p. 152
#18 Outing	Plan and participate in an outing, identify poisonous plants and describe first aid	p. 164
#19 Fishing	Identify and catch fish, carry out one fish conservation project	p. 168
Bear Badge		Bear Book
Wildlife Conservation Achievement 1 (required)	Tell why wildlife is important to man, three wildlife laws, what conservation officer does, how we can improve birds' habitat, names of five wild animals in area and why common, name one rare animal and why rare; plant and care for tree or shrub; visit zoo, wildlife refuge, etc.	pp. 10-21
Electives (choice optional)		
#19 Water and Soil Conservation	Find out what different kinds of soil are like and how they affect plant growth, how soil can be lost and how plants protect it; explain water cycle	pp. 160-163
Webelos		Webelos Book
Activity Badges (choice optional)		
Forester	Learn varieties, uses, life cycles of trees; plant and care for; learn about fire prevention	pp. 106-116

Figure 1. (continued)

Rank/Award	Requirements	Reference
	CUB SCOUT PROGRAM (continued)	
Webelos (continued)		Webelos Book
Geologist	Identify varieties, qualities, and uses of different minerals; explain causes of volcanoes, etc.; formation of mountains	pp. 119-136
Naturalist	Observe, study, read about insects, birds, reptiles or mammals	pp. 138-149
Arrow of Light Award	Earn Naturalist Badge Learn Scout Outdoor Code	p. 268 p. 62, Scout Book
	BOY SCOUT PROGRAM	
Entry Requirement	Understand and agree to follow the Outdoor Code, which stresses cleanliness, fire prevention, and conservation	pp. 62-67
Tenderfoot Scout 2nd Class Scout 1st Class Scout	No environmentally-related requirements	
Citizenship in the Community Merit Badge	Req. 10, find out about town water supply Req. 11, investigate sources of pollution Req. 12, explain importance of land-use planning to various sectors of the community	p. 88
Star Scout Life Scout	No environmentally-related requirements	
Eagle Scout		
Environmental Science Merit Badge	All requirements for this badge are environmentally related (see Section III, p. 53)	p. 90

ecosystem, and little to encourage the Scout to think about the results of his own decisions and actions in environmental terms.

On the other hand, a Boy Scout who is interested in this area has his choice of appropriate merit badges, and his troop may choose to participate in a number of special programs and projects. (These materials and programs are described in an annotated list of EE-related Scouting materials in Section III of this study report.) The amount any boy learns in this area will, of course, depend on how many such merit badges or programs he is involved in. The total Scouts completing or involved in each badge or program are summarized in Figure 2.

Figure 2 demonstrates that the most popular merit badges are those required for advancement in Scouting. Of those with the highest environmental content, the two that are not required are less popular than required merit badges, and those that are not required but have moderate and low environmental content are scattered throughout the middle ranges.

Although between a third and a half of all Boy Scouts attend summer camp and may be exposed to environmental education there, only 20,000 participated in Project SOAR last year,* and the number participating in Ecology Workshops appears to be quite small.

It is therefore apparent that although most of the fundamentals of environmental education contained in the FICE Report are paralleled at some level in Scouting materials, it is unlikely that an individual Scout will have been exposed to all of them. A Scout's knowledge of the environment may vary from familiarity with basic conservation precepts to a fairly sophisticated level of understanding, depending on how many environmentally-related merit badges and other experiences he has chosen.

*This may change in 1977 if the current phase of Project SOAR gains impetus from President Carter's Energy program.

Figure 2: PARTICIPATION IN ENVIRONMENTALLY-RELATED MERIT BADGES AND OTHER PROGRAMS

Total Scout Membership: 1,339,117

Merit Badge	Number of Boys Completing In 1976	Popularity in Terms of All Badges Completed
High Environmental Content		
Environmental Science (required)	61,165	8th
Nature	22,735	34th
Energy	no statistics yet	
Soil and Water Conservation	17,471	39th
Moderate Environmental Content		
Bird Study	3,937	87th
Fish & Wildlife Management	16,247	43rd
Mammals	27,205	28th
Forestry	14,951	45th
Citizenship in the Community (required)	124,528	2nd
Low Environmental Content		
Fishing	50,146	12th
Geology	9,682	56th
Insect Life	3,405	92nd
Oceanography	4,459	85th
Reptile Study	11,286	53rd
Weather	5,464	74th
Citizenship in the Nation	58,468	10th
Citizenship in the World	48,352	13th

Other Programs	Number of Boys Participating In 1976
Boy Scout Summer Camp	522,000
Ecology Workshop (National)	500
(Local)	no data
Project SOAR	20,000

Figure 3 illustrates a degree of congruence in the FICE Report fundamentals and the stated objectives of the Scouting program. Two factors affect the usefulness of this comparison, however. First, the analysis of Scouting objectives includes only specifically stated objectives and does not include objectives that may be implicit in the content of materials cited. Second, the FICE subcommittee developed some of the fundamentals in greater detail than others, and it is therefore difficult to make comparisons in a consistent manner.

Nevertheless, certain conclusions may be drawn concerning the focus of interest in Scouting materials and programs. For instance, it is apparent that there is a great deal more information on the parts of ecosystems and their activities than there is on the environment as a whole and, although there is a fair amount of information on what human beings do to ecosystems, there is little on what ecosystems do to human beings. People are depicted as more or less free agents acting upon the environment rather than acting within it. The implications of our role as a species within an ecosystem are not explored.

While two out of four sections of the FICE Report deal with strategies for changing human social system and ecosystem interactions, Scouting appears to place comparatively little importance on that aspect of environmental education.

C. RECOMMENDATIONS TO SCOUTING/USA

1. Cub Scout Program

A primary Cub Scouting goal is to provide a program which the boy will enjoy. The goal is accomplished by offering interesting and exciting activities

Figure 3. SCOUTING OBJECTIVES RELEVANT TO MAJOR FUNDAMENTALS OF EE

Fundamentals	Numbers of Objectives
Section I. Earth's Environment	
A. Earth's environment is a whole.	11
B. The Ecosphere is a macro-system . . .	78
C. Energy and materials for all life are components of ecosystems . . .	23
D. Each ecosystem includes a number of species . . .	15
Section II. Humans as Ecosystem Components	
A. Humans use ecosystems . . .	21
B. Humans affect ecosystems . . .	16
C. Ecosystems affect humans . . .	6
D. Components of ecosystems interact continuously . . .	47
E. Humans must be accountable for their impact on ecosystems	8
Section III. Harmonizing Human Activities with Ecosystem Processes to Achieve Ecosystem Quality	
A. Methods	9
B. Implementation	4
C. Individual and Institutional Action	9
D. Legislation	1
Section IV. Questions and Issues Relevant to Use Of Energy and Resources	none

that also can gently develop character, impart knowledge and skills, and change attitudes. Obviously this is not the place to sit the boys down and map out the complete fundamentals of environmental education.

However, those environmentally related activities which are already included in the program could perhaps be used to greater advantage were the Cub Scouts given some kind of background or context within which to place them. A first step in doing this would be to introduce leaders and parents to the basic principles involved, and to encourage them to point out relationships, ask questions, and talk about the implications of their activities with the boys.

Wolf

In the Parents' Supplement, Conservation Achievement Section, something like the following could be added:

> Your son will get more out of this Achievement, and any of the related Arrow Point Electives he may later choose (Birds, Gardening, Outing, Fishing), if he knows something about the larger picture to which all these things belong. The simplest way of achieving this is for you to talk about each activity as your son does it. Point out relationships between plants and animals (including people); encourage him to speculate on how different things in the environment affect each other; get him thinking about the effects of his own actions. Even an eight-year-old has to make decisions about how he will use and dispose of both natural and man-made products. Try to get him to consider what he is doing and why.

Some specific additions to the Wolf Book might also be considered. For instance, the requirements for the Conservation Achievement could be revised to include a question about the relationship between our use of raw materials and pollution, or between pollution and the way things grow. He could also be asked to explain why we conserve water and natural resources. Of course, additional questions would require that additional explanatory materials be inserted in the text.

The conservation projects suggested in the Fishing Elective are a good idea. Similar projects should be added to the electives on Birds, Gardening, and Outing.

Bear

The Bear level offers opportunities for a somewhat more intensive approach to environmental education, since the boys are older and have the Wolf background on which to build. A section (similar to the one on drugs) could be added to the Parents' Supplement that would present certain basic environmental principles. In addition, the supplement could suggest ways in which parents might present these principles to their youngsters.

This supplement might begin with a general statement concerning contemporary environmental problems such as oil spills, black-outs, smog and other pollution; the energy crisis; and extinction of species. Further, a summary of attempts being made to improve the situation, including legislative, interest group and individual strategies for effecting change, could be discussed. Environmental problems are mentioned frequently in the media and the schools. Most Scouts are somewhat aware of many of them and are probably already concerned. This awareness provides an excellent opportunity for parents and children to learn and work together to improve the family's use of resources and sense of environmental responsibility. A number of basic principles that could serve parents as a thematic framework in family discussions of environmentally-related matters might include the ideas that:

- Everything in the world (including us) is a part of the whole ecosphere. Everything, either directly or indirectly, affects and is affected by everything else.
- In order to understand their relationship with the rest of the world, people need to know about their environment.

- Decisions are significant and complex. People should be able to justify the decisions they make and should accept responsibility for the short- and long-range effects their decisions might have.
- There is no such thing as a free lunch. Everything has a cost, if not in money then in another currency such as energy or resources.
- Resources should be used efficiently. In part, conservation means not using something expensive and scarce to do a job if something simple and abundant will do it just as well.
- What we do now will affect what our future is like. The Cub Scouts of today will be the fathers of tomorrow. They should begin thinking about how things happening today will change the world they will live in when they grow up.

Parents and Scouts should be encouraged to think about these ideas. They are appropriate topics in the context of the family's daily actions and decisions, as well as in Cub Achievement or Elective activities. After all, good family conservation practices require the cooperation of children as well as adults, and the standard of living of most families is affected by decisions concerning resource use.

Additional environmental content could be added to the Bear Book itself.

Achievement 1 -- Wildlife Conservation offers a good opportunity to introduce concepts of interdependence, the food chain, etc. It is anthropocentric to focus discussion on why wildlife is important to man. The explanation on page 11 might be revised to explain the place of wildlife in the cycle of nature, including topics such as nature, pest control, etc., but not limited to them. Conservation measures should be presented as means of maintaining this cycle. (A modified version of the explanation in the Environmental Science Merit Badge pamphlet could be used here.)

Of the Electives, #19 -- Water and Soil Conservation -- is the most successful at presenting the environmental implications of its subject matter. However, several of the others could be improved with little change.

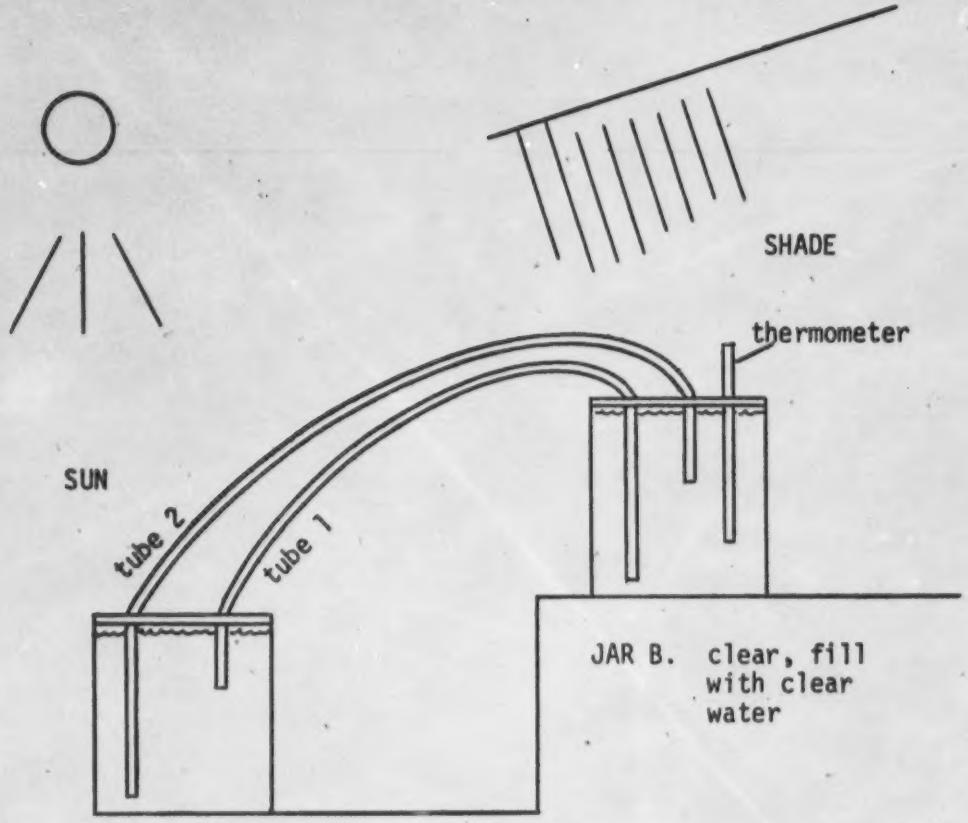
In Elective #2 -- Weather -- information (and the corresponding knowledge requirement) could be added on how human activity affects the weather (see Weather Merit Badge). For Elective #4 -- Electricity -- information on where electricity comes from, how it is produced, and why it is necessary to conserve might be included. Elective #7 -- Things That Go -- offers a wonderful opportunity for parents and children to explore alternative energy sources. In addition to wind and water, solar power might also be explored. (See Figure 4.) Note that these are all alternatives to fossil fuels. Suggest that the family research solar water heaters. Elective #14 -- Landscaping -- could include environmentally responsible gardening practices such as use of native plants, mulching, companion planting, etc.

Webelos

The Webelos Parents' Supplement might contain the same introduction to environmental education that was recommended for the Bear Book. The Webelos Book itself presents several Activity Badges that either include, or offer opportunities to add, environmental content.

The most important of these is the Arrow of Light Award. The list of requirements for the Arrow of Light badge refers Scouts to an Outdoor Code on page 116. Unfortunately, the code is not on page 116.

The Citizen Badge is one of three badges discussed here that is required for the Arrow of Light Award. Perhaps a requirement and corresponding discussion might be added concerning the importance of wise use of national resources. Another, the Naturalist Badge, would be more effective if relationships among the various creatures studied were indicated. An illustration of the food pyramid, for example, might suffice. Here, animals are compared according to their basic needs and how those basic needs are met. Discussion of the food



Colored water will rise through tube 1 and replace clear water.

See how long it takes for water in Jar B to turn blue and warm up.

Figure 4. Solar Power: Water Transfer Experiment

Two large peanut butter jars
Two 1-yard lengths aquarium tubing
Electrical tape
Black paint
One thermometer

Put tubes, etc., through holes in tops, seal.

S-47

pyramid provides a good opportunity for leaders to help boys share information with each other.

The Outdoorsman Badge, also required for the Award, contains the least environmental content. A section on outdoor courtesy (similar to the one in the Outdoor Code) could be included here which would discuss why branches should not be torn off trees, why tree trunks should not be carved, why green wood should not be cut for fires, why flowers should not be picked, why earth should not be dug, and why litter should be disposed of properly.

Forester and Geologist Badges are also relevant. A discussion concerning the effects of pollution on trees might be added to the material in the Forester Badge. In the Geologist Badge, a section explaining the origin of fossil fuels would be appropriate.

2. Boy Scout Program

(a) Basic Program

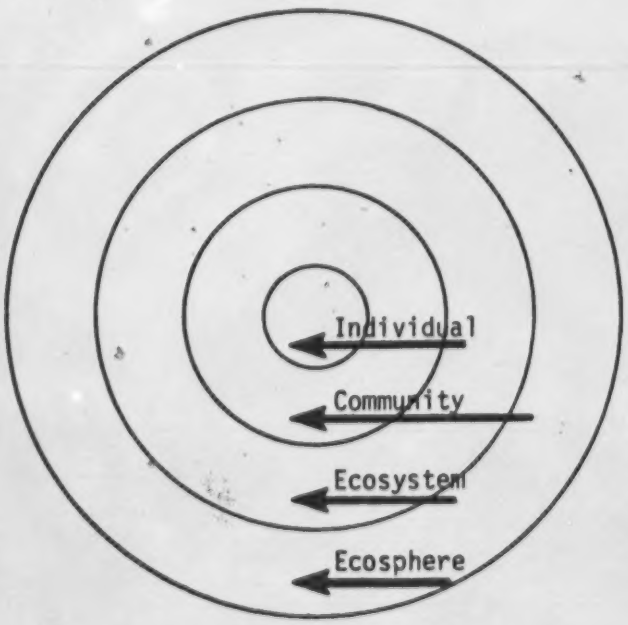
Environmental content is formally required only three times during the Scout program: 1) for entry (the Outdoor Code), 2) for becoming a First Class Scout (the Citizenship in the Community Badge), and 3) for becoming an Eagle Scout (Environmental Science Badge).

Since participation in other activities, such as camping, depend upon the troop and the individual Scout's interest, it is up to the Scoutmaster to find opportunities to teach Scouts about the environment. When teaching the Outdoor Code, for instance, the leader might expand upon the reasons for the various rules and begin to suggest the larger environmental picture to which all things belong. Already developed programs such as the Ecology Workshop could provide Scoutmasters with the necessary background.

(b) Level of Objectives

Materials in the Scouting program tend to address environmental phenomena empirically rather than conceptually. The learner may be taught to identify, observe, describe and/or experiment with natural facts and processes, but remain unable to perceive the concepts and natural laws that govern these phenomena. It should not be assumed that learners will automatically identify significant facts in each activity and combine them mentally to arrive at appropriate concepts about the environment unless those activities are presented in an arrangement designed to produce such a result.

Environmental understanding is not only familiarity with environmental facts, but with the larger systems and relationships within which they exist. In environmental terms, knowledge levels might be represented thus:



For example, an individual level program objective is: "List the purposes of the different parts of a tree." (Forestry, p. 17.) Objectives at this level are by far the most numerous in the programs. A community level objective is: "List elements that determine the carrying capacity of an area." (Mammals Merit Badge, p. 23.) There are fewer examples at the ecosystem level. One is: "Tell how the pyramid of numbers affects the food chain." (Fish and Wildlife Management Merit Badge, p. 28.) An ecosphere level objective was found in Geology, page 67: "Know the basic theories about the events that created our earth as it is today."

Some of the Merit Badge pamphlets, for example, Energy, Environmental Science, Fish and Wildlife Management, Nature, and Soil and Water Conservation, present all four levels reasonably well in terms of content if not in knowledge required. However, other merit badges with environmental relevance, such as Weather, miss excellent opportunities to develop environmental understanding. When Merit Badge pamphlets are revised they can be improved by 1) demonstrating relationships between the phenomenon being discussed and other aspects of the ecosystem, and 2) by presenting people as part of nature -- as subject to the laws of ecology as are other species.

In addition to those merit badges already discussed in this report, the following badges have potential relevance to environmental/energy content areas. If other environmental/energy content area badges are revised, these too might be considered for revision:

First Aid -- smog alerts, pesticide poisoning, etc.
Camping -- outdoor courtesy
Emergency Preparedness -- ecological disaster
Wilderness Survival -- outdoor courtesy, basic needs
Public Health -- environmental legislation, safety measures
Gardening -- function of soil, weather, etc.
Electricity -- alternative sources of electric power
Animal Science and all other farm-related badges -- effects of environmental factors
Space Exploration -- space as potential source of resources
Atomic Energy -- pros and cons of nuclear power, effects on environment
Landscape Architecture -- effects of soil, weather, etc.
Engineering -- using alternative sources of power
Consumer Buying, Business -- resource and energy costs of different products

(c) Consistency

To ensure a consistent approach, avoid overlap, and match concepts with appropriate Scout activities and age levels, a map of environmental education objectives in the Scouting program could be prepared. Scouting leadership can utilize this report as a starting point from which to analyze the role of environmental education in Scouting. If changes in this role are desired, new concept and knowledge goals must be clarified. Ideas and materials from The Fundamentals of Environmental Education, school and other programs might be included. Amplification of the program in this manner would produce a detailed description to guide revisions, deletions and additions of environmental content in the program. Each part of the program should be analyzed as well as the whole. Presented during Scout leader training, this analysis would demonstrate those portions of the environmental education program for which each leader is responsible, and how these relate to what preceded and what will follow.

SECTION III

ENVIRONMENTALLY-RELATED MATERIALS AND PROGRAMS OF SCOUTING/USA

This section of the report presents an annotated list of the materials and programs designated by SCOUTING/USA as environmentally related. The objectives stated in Section I of this report, as well as the comments made in Section II, are based on a study of these materials and program descriptions.

The list presents the following types of materials and programs:

Handbooks

Merit Badge Pamphlets

Special Programs: Workshops

Special Programs: Guides

Special Programs: Projects and Activities

Informational Materials

Awards

Adult Leadership Materials

For each item in the above categories, environmental education content is indicated, and the overall level of environmental education content is rated high, medium, or low. The rating is approximate.

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
HANDBOOKS			
Bear Cub Scout Book - for boys 9 years old. Environmental references pp. 10-13, 80-89, 126-129, 136-143, 160-163.			X
Wolf Cub Scout Book - for boys 8 years old. pp. 56-59, 142-155, 164-172.			X
Webelos Scout Book - for boys 10 years old. Environmental projects are described on pp. 106-176.			X
Boy Scout Handbook - the basic Scout book. Activities featured include an Environment Skill Award, pp. 275-322. Merit Badge requirements are also listed.			X
Boy Scout Field Book - for Scouts 14 years and older. It provides more advanced outdoor skills and knowledge: identification of ecosystem types and components, pp. 335-479; conservation, pp. 480-493; evolution of the earth and weather, pp. 495-503.		X	
MERIT BADGE PAMPHLETS			
Bird Study - Deals mainly with types of birds and bird watching techniques. Has some information on the survival needs of birds, and a section on extinct or endangered species.			X
Citizenship in the Community - Required for 2nd Class Award. Requirement #10 deals with water supply and shortage; #11 with water pollution; #12 with land use planning.	X		
Citizenship in the Nation - Requirement #9b touches on resource management; #9c on conservation agencies, groups, and projects.			X

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
MERIT BADGE PAMPHLETS (continued)			
Citizenship in the World - Requirement #7 deals with the relationship between natural resources, economy, politics, and progress.			X
Energy - Requirements deal with alternative energy sources and energy conservation. Introduced in fall, 1976.	X		
Environmental Science - A pamphlet which defines terms, cycles, food chains, functions of soil, water, air and animals, and causes and effects of pollution (required for advancement to Eagle Scout).	X		
Fish and Wildlife Management - Discusses means of controlling wildlife, food chains, man's relationship with wildlife, and job opportunities. Also describes Scout projects.		X	
Fishing - Describes types of fish and how to catch and cook them.			X
Forestry - Discusses identification and uses of trees and forestry management techniques.		X	
Geology - Describes past and present changes in the earth, animal and plant development affected by it, and what a geologist is and does.			X
Insect Life - Describes insects, insect societies and how insects help or harm human beings.			X
Mammals - Discusses the food chain, interdependence of species, definition of a mammal and identification of species.			X
Nature - Provides a general overview of nature study, soil, plants, animals, reptiles, water, the food chain, people's effects on nature, and conservation.		X	

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
MERIT BADGE PAMPHLETS (continued)			
Oceanography - Defines and describes oceanographic components and phenomena, with little discussion of causes and effects or people's role.			X
Reptile Study - Presents information on reptiles and amphibians, but little content on food chains or people's relationships to these animals.			X
Soil and Water Conservation - Discusses life cycles as related to soil and water. Its main focus is on types and causes of erosion and pollution, and people's contribution, both constructive and destructive.	X		
Weather - Describes weather types and causes, and effects on the rest of the environment.		X	
SPECIAL PROGRAMS: WORKSHOPS			
Ecology Workshop - Describes the web of nature, and the spaceship earth concept. Contains worksheets, glossary of ecological terms, where to write for conservation career information, conservation publications list of the BSA, list of films and materials and where to get them, and diagrams of life cycles that are covered in various merit badge pamphlets.	X		
Ecology Workshop 1974 - Describes the purposes, theme, objectives, and methods used at Camp Bucoco and Slippery Rock, Pa.			X
Exploring Ecology Workshop - Gives a basic idea of what the course entails -- understanding environmental problems and developing problem solving techniques.		X	

ENVIRONMENTALLY-RELATED MATERIALS AND PROGRAMS

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
SPECIAL PROGRAMS: GUIDES			
Maine National High Adventure Area - This booklet describes the geological evolution of the area, wildlife and their survival needs, and how to use a compass.		X	
Conservation Education Trail Guide - Provides basic information on soil and the forest environment. It is designed for use while actually following the trail.			X
SPECIAL PROGRAMS: PROJECTS AND ACTIVITIES			
Scouting Environment Day Special Interest Release, April 24, 1976 - Outlines objectives, organizational method, and possible projects such as recycling, community service, and planting trees and shrubs.			X
Soil and Water Conservation Activities for Scouts (U.S. Dept. of Agriculture) - Provides experiments and information about soil function, quality and types; plant and forest types and uses; and water conservation needs and problems.		X	
Guidelines for Effective Recycling - Describes waste and waste-related problems, what recycling is and does, and how a troop can set up and benefit from a recycling program.		X	
Citizenship through Service - Offers 150 different projects many of which relate to environmental education, e.g. erosion control; tree planting and pruning; creating a wildlife refuge, etc.		X	
Conservation Guide for Cub Leaders, Idea Sheet - Outlines projects and requirements for Cub Scouting.			X
Cub Scout Conservation Activities for Summer, Idea Sheet - Suggests places to visit and projects for Cub Scouts to do.			X

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
SPECIAL PROGRAMS: PROJECTS AND ACTIVITIES (continued)			
Project Save Our American Resources (SOAR)			
1971 Project SOAR and Supplement - Outlines goals and rationale of the program, and sets up time lines and possible troop, pack, and post projects for the kick-off of project SOAR in 1971.	X		
Our American Heritage - Focuses on water and water projects, and gives examples.		X	
SOAR, A New Way Up - Discusses water problems, projects, and water as a resource.		X	
Save Our Water Resources - Discusses water resources, including current and future problems and solutions in conservation and pollution.		X	
Conservation Idea Sheet, Let's Go Fishing - Combines fun with basic conservation activities related to the aquatic life cycle.			X
Mobilize for Energy Conservation - 1975-76 SOAR program. Its basic objective is to educate for the purpose of reducing energy consumption. It provides ways of increasing learner awareness through discussions and projects such as recycling.	X		
What's It Worth? - Slide show with script. Needs updating and revision.			X
Scout Council Paper Recycling Kit - Includes instructions and model materials for paper recycling project.		X	

ENVIRONMENTALLY-RELATED MATERIALS AND PROGRAMS

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
INFORMATIONAL MATERIALS			
Conservation Chart - Compares two river valleys, one of which has been managed badly, one well. Shows what animals can live where, and why.	X		
Ecology Signs - These signs are designed to interpret the concepts of ecology in an informative, interesting way. They stress the importance of the interrelationships of resources in the web of nature.	X		
Ecology and Conservation Posters - Includes ten posters and instructor's sheets explaining each on ecological topics, such as: How Soil is Formed, How Plants Make Food, and Wildlife Needs.	X		
Environmental Posters - Ten posters and instructor's guides on environmental issues such as land use planning, open space, recycling, and air pollution.	X		
AWARDS			
U.S. Department of Agriculture Council Conservation Award - 1975 - Award for Scout Councils which have developed good programs and conservation plans for their camps.		X	
William T. Hornaday Award - Award for outstanding achievement in the area of conservation.		X	
World Conservation Award - Special award for a Scout who has earned environmental and conservation skill awards, Environmental Science Merit Badge, either the Soil and Water Conservation or Fish and Wildlife Management Merit Badge, and the Citizenship in the World Merit Badge.		X	

ENVIRONMENTALLY-RELATED MATERIALS AND PROGRAMS

MATERIALS/PROGRAMS	EE CONTENT LEVEL		
	High	Medium	Low
ADULT LEADERSHIP MATERIALS			
Ecology/Conservation Director's Guide - A guide for national camping schools, which gives a basic course outline and lists resource material in various subject areas. These areas include: weather; soil and water; forestry; fisheries; wildlife; and geology. It also has instructions on how to teach, shows how to set up a camp conservation plan, and describes projects and activities.	X		
Ecology Workshop Instructor's Guide - Provides ideas for experiments and discussions on: forest ecosystem; street ecosystem; grassland and field; lake and pond marsh; bog, and urban and suburban ecosystems. It briefly covers the legislative process with regard to conservation, and provides work charts in each area for learners. It assumes leader has environmental background and resources.	X		
Scoutmaster's Handbook - Includes discussion of the outdoor program and how to manage it.			X
Patrol and Troop Leadership Guide - Discusses management of the outdoor program.			X
Scouting USA Charter and Bylaws - Outlines Scouting's structure and purpose, including outdoor and conservation goals.			X
An Evaluation of the Ecology Workshops at Schiff Reservation - Provides statistics on what types of ecosystems and discussions interested learners most.		X	
USDA Conservation Award Project Summaries - Describes projects conducted by Scout councils which qualified for the award.		X	